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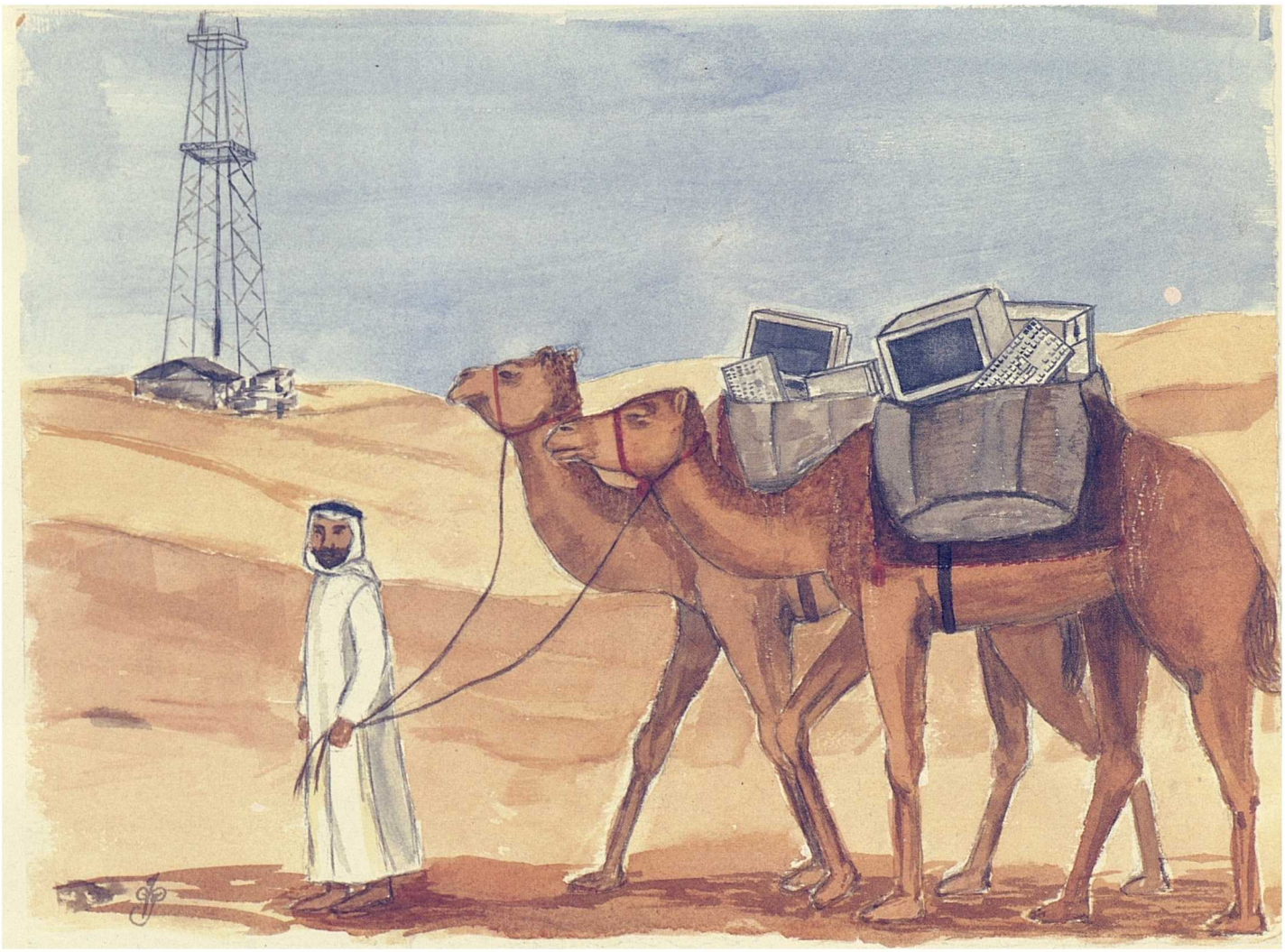
The Impact of Computer Technology on Accounting and Auditing in the Middle East with Special Emphasis on Arabisation, Transfer of Technology and Training



Sami Abbas Hussain Ali

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VOLUME I

CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES

LIST OF TABLES

LIST OF TABLES

LIST OF TABLES

LIST OF TABLES

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ABSTRACT

The purpose of this research is to examine closely the impact of information technology on accounting and auditing , in particular, the computer technology on accounting and auditing in the Middle East with special emphasis on arabisation, transfer of technology and training.

The use of computers and information technology is altering the way we do things. Middle East practitioners at present are experiencing a transition in contemplating the use of technology to improve their working methods.

The traditional role of Arab accountants is changing. There is a great deal of demand for improved skills to cope with the increased use of technology by government agencies, private businesses and educational institutions.

The improved economic conditions in the Middle East over the past decade have made it possible to acquire new technology, and at the same time made it necessary for accountants and auditors who do not have technical skills to upgrade their standards to deal with the revolution of information technology that is taking place in the West.

The objective of the research is to deal with two distinct problems relating to computer technology. The first is that of existence of such technology in the Middle East. The second concerns the appropriate level of its introduction to the region.

The specific objectives of this research are as follows:

(a) to review the current status of computer technology worldwide and in the Middle East;
(b) to outline the inadequacies of the current practice by businesses, governments, auditing firms and educational institutions;
(c) to show how the region may benefit from the introduction of computer technology; and
(d) to discuss the implications of such technology on the region as a whole and its impact on issues such as Arabisation, transfer of technology and training.

To accomplish the desired objectives of the research, a research methodology was used and included a historical analysis and literature search and pilot study and analysis of the survey which included computer technology users, providers and consultants. The study focused on the key variables namely introducing the technology and its impact, computer hardware, computer software Arabisation and training and skills transfer.

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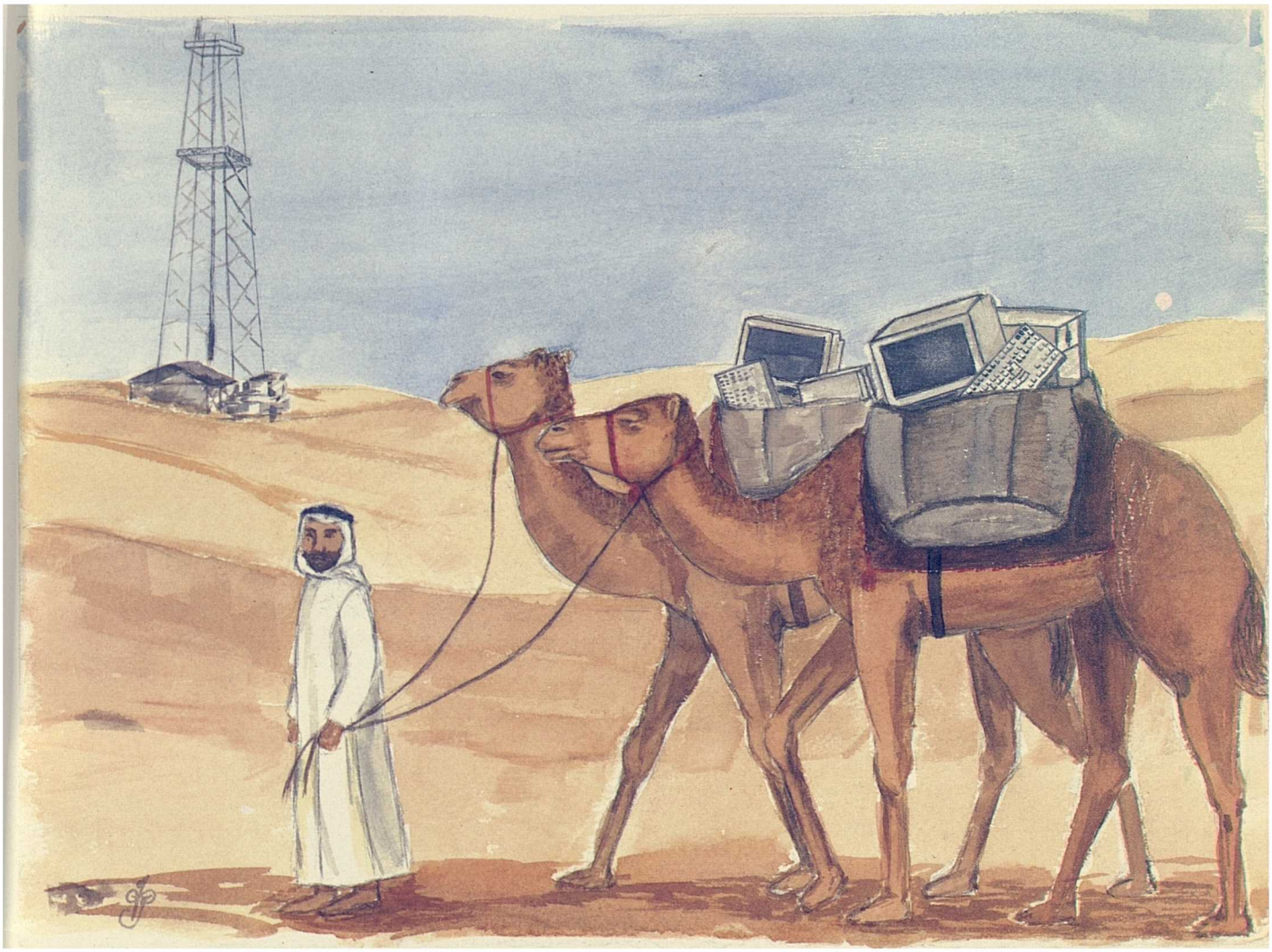

CHAPTER 1

INTRODUCTION

CHAPTER I

INTRODUCTION

1.1 Background to a Selected Number Of Countries in the Middle East

Recent changes in the world economy have had a profound impact on the Arab countries. The nature and extent of the impact varied greatly from one country to another. It is possible to identify three groups of countries in the Arab world (1).

(a) Oil exporting countries such as Algeria, Bahrain, Iraq, Kuwait, The Libyan Arab Jamahiriya, Oman, Qatar, Saudi Arabia and the United Arab Emirates.

(b) Middle income countries comprising Egypt, Jordan, Lebanon, Morocco, The Syrian Arab Republic and Tunisia.

(c) Low income countries such as Mauritania, Somalia, Sudan, The Yemen Arab Republic and Djibouti.

The study will concentrate on the oil producing countries in the Gulf.

For the oil exporting countries, the single most important factor has been the rise and fall in the price of oil which constitutes on average more than 90 percent of their exports. During the better part of the 1970s and early 1980s, these countries were in a fortunate position of adjusting to the dramatic increase in their wealth following soaring oil prices. More recently they have been confronted with the consequences of an equally dramatic decline in their oil revenues a trend which seems to continue in 1990's.

For almost a decade after 1973, following the escalation of oil prices, the oil exporting countries faced the uncommon challenge of adjusting to a massive increase in foreign receipts and large external payment surpluses (2).

Typically, the immediate policy response was to increase government spending with a view to redistributing part of the increased oil earnings, promoting domestic absorption and encouraging private sector investment. This was a sound policy strategy not only from the standpoint of domestic development but also from that of global adjustment. Domestically, the challenge for the oil exporting countries was to foster more balanced economic development while maintaining the financial stability that had historically characterised their economies.

The oil exporting Arab countries achieved a considerable measure of success in bringing about more balanced growth and realised important gains in terms of diversification. Virtually all sectors in the oil exporting countries particularly manufacturing, construction and services witnessed rapid growth. However, in some countries, lags in development of infrastructure led to bottlenecks aggravating inflation and exerting upward pressure on real exchange rates.

From the standpoint of global adjustment, the very strong growth of imports of goods and services by oil exporting countries from the rest of the world provided an important offset to the recessionary tendencies in the world economy in the mid 1970s. At the same time, the oil exporters took the opportunity to accumulate large holdings of official reserves and other foreign assets.

1.1.1 Demography of the Region

The Arab countries which have been selected in this study include Saudi Arabia, United Arab Emirates, Qatar, Bahrain and Kuwait. These are the most affluent countries in the region with sufficient financial resources to acquire the technology and hire professional staff to help them use it. These countries are bound by a joint economic agreement called "Joint Economic Agreement of the members of the Gulf Co-operation Council" (3). The agreement calls for closer and stronger relations and ties based on willingness to develop, expand and support their economic ties on stronger bases and for the benefit of their people. The agreement was drafted in order to co-ordinate and unify their economic, financial and monetary policies as well as their commercial and industrial legislation and their customs regulations.

In the remainder of this section these countries will be explored individually with a view to establishing an understanding of the country and the opportunities for the use of information technology. Various references and brief quotations are made in this research to materials on the countries in the region which have been compiled and issued by a number of organisations operating in the region including banks, public accountancy firms, government gazette and the International Bureau for Fiscal Documentation.

1.1.1.1 Major industrial and economic development of countries in the region

(a) Saudi Arabia

Since the 1970s oil boom, Saudi Arabia has rapidly developed a modern infrastructure. It has up-to-date seaports, an efficient network of roads, three international airports and numerous regional ones. Its telecommunication system is advanced. It has two modern industrial cities, Jubail and Yanbu, and industrial estates in several other major cities. It is equipped with modern hospitals and numerous universities and vocational training centres.

The 1980s decrease in world oil demand and prices led to decreased government spending and a reduction in economic activity. However, beginning in 1986, however, the government increased oil production, enabling the economy to grow again. Through its five year (1985-1990) economic plan Saudi Arabia was pursuing two economic goals:

- development of industry, agriculture and mining to decrease dependence on oil; and
- the private sector's assumption of responsibility for the economic development of the Kingdom.

To achieve the first goal, the government encouraged the creation of joint ventures with foreign participation and management. These joint ventures have gradually evolved into enterprises with Saudi management and Saudi ownership of a majority interest. The second goal was promoted through round table discussions between the government and the business community.

These goals, together with Saudi Arabia's need for technical know-how and foreign expertise, its developed infrastructure and its active private sector, were combined to create a wide range of potential economic opportunities for business interests in industrialised nations (4).

According to a memorandum issued by Clifford Chance, an international law firm operating in the Gulf Region that the countries of the Gulf co-operating council are considered to be important customers for overseas military and civil works equipment and service suppliers. In Saudi Arabia and the United Arab Emirates increased emphasis is being given to ensuring that part of the significant cost of defence procurement from overseas contractors is offset by investment in the purchasing country (5).

According to Clifford Chance, it is anticipated that in future this type of offset investment requirement will be extended to major non-defence related projects. In this connection, the Saudi Ministry of posts, telegraphs (PTT) has been reported to be considering attaching offset investment as a requirement to a proposed contract for a major expansion and upgrading of the kingdom's telecommunication system (6).

Other GCC states are likely to adopt similar programmes to offset part of their defence and major civil works procurement contracts in future. Consideration was given to including an offset investment requirement for the main contract for Bahrain's expansion of the Alba Aluminum smelter defence procurement contracts and foreign civil and aircraft orders in Kuwait, following the liberation of that country in early 1991, are likely to include an element of offset investment; Qatar too is studying ways in which offset investment may be implemented.

The concept of offset is that foreign suppliers should plough back a proportion of their contract's value into an investment in their country, with the overall intention of assisting in the economic development of that country (7).

Key economic indicators according to latest published results are as follows:

Table 1.1: Key Economic Indicators

	1993	1992
GDP ($ million)	110,200	110,200
GDP growth (per cent)	0.0	5.0
Inflation (per cent)	0.0	-4.0
Trade surplus ($ million)	10,000	13,000

GDP = gross domestic product

Source: Government figures.

MEED estimates

According to MEED the Kingdom planners are building on firm foundation with a gross domestic (GDP) of more $ 110,000 million, Saudi Arabia is already the largest economy in the Middle East. Long the largest oil exporter it has recently overtaken Russia to become the world's leading oil producer. The Kingdom's wealth has made it one of the biggest importers of goods and services outside the OECD.(8) As shown in table 1.2 that the Kingdom's balance of payments published earlier in 1994 shows exports rising to almost $50 billion in 1995.

Due to surging oil sales and firmer prices, the Kingdom's oil exports are projected to rise to 8.9 million barrels a day (b/d) in 1995 and 9.4 million b/d in 1996. Despite rising imports, the current account deficit will fall to $ 3 billion in the year. The deficit will start rising again in 1996 on a further increase in imports. The most consistent trend is in external debt which is forecast to rise to more than $37 billion in 1996. This will more than twice the 1989 level, but still less than a third of forecast gross domestic product that year.(9)

Table 1.2: Saudi Arabia: current and capital account forecast, 1994-96

	----------($ million)----------		
	1994	1995	1996
Exports	41,553	49,168	49,189
Imports	25,626	27,893	29,356
Trade balance	15,927	21,275	19,833
Net Services	-13,927	-15,974	-16,283
Transfers	-9,000	-8,300	-8,300
Current account	-7,000	-3,000	-4,750

Source: Trade & Finance. The Petroleum Finance Company, Washington DC

August 1994

(b) United Arab Emirates

Exploitation of oil and gas reserves during the 1970s and 1980s enabled the seven Emirates making up the UAE to achieve substantial economic growth. Economic activity centred on the development of a modern infrastructure, including roads, ports, airports, telecommunications, electric utilities and desalination projects; the construction of residential and commercial structures, schools, hospitals and hotels; and the establishment of petrochemical and manufacturing industries.

The economy is influenced by fluctuations in the international market because oil, gas and related petrochemical industries continue as the most important economic sector. To reduce the dependence on petroleum by diversifying the economies of the oil producing Emirates and to establish a firm economic base for the country as a whole, the federal and individual Emirate governments have initiated programmes to attract foreign and local investment in fields they believe will be of national benefit. Manufacturing and agricultural projects that will help the UAE move towards self-sufficiency are particularly encouraged.

To attract investments of expertise and capital, the governments of the individual Emirates seek to provide an attractive environment to promote business activity within the country. The following are some of the principal features of the economic and business environment (10):

- a co-ordinated infrastructure, which provides all essential utilities to the major centres;
- excellent communication systems with the Middle East region and the rest of the world;
- a virtual absence of taxation;
- a well-structured financial sector with no exchange control regulations;
- free trade zones, which ensure ease of registration and efficient operating facilities;
- minimal financial reporting requirements at both the federal and the local Emirate levels; and
- an attractive social environment, including modern educational, medical and recreational facilities.

According to Clifford Chance the UAE Offset Programme was launched in 1990 and its stated aims are to generate foreign exchange, create jobs for UAE nationals, transfer technology from overseas to the UAE and generally create a favorable business environment. The UAE Offset Programme applies only in respect of defence contracts with the Federal Armed Forces and not those with, for example, the Dubai Defence Force.

As in Saudi Arabia, offset investment in the UAE is regarded as a valuable investment for the country's national economic development. Consequently, whilst defence procurement contracts are an obvious starting point for offset requirements, it is possible that these will be extended subsequently to other large civil contracts.

To be accepted as offset investment, proposals put forward by foreign vendors must meet criteria related to long-term commercial viability, price, technology transfer and represent either a new business activity or an extension of commercial entities presently being undertaken by overseas suppliers in the UAE.

As regards technology transfer, the proposed offset investment must employ technology which is at least equivalent in sophistication to that of the goods or services purchased. Preferably, the technology transferred should include elements which are not presently available to local companies in the UAE. Such technology may be transferred by licensing, patents and through continued access to foreign expertise and data.

The UAE Offset Programme also provides that cash payments may be made by the foreign contractor in lieu of a conventional offset proposal. Such cash contributions will be subject to negotiation between the UAE Offset Group (UOG), representing the UAE Federal Government, and the relevant foreign contractor and will be deposited in an Offset Development Fund for subsequent disbursement by the UOG to high priority projects in accordance with perceived national development priorities (11).

Key economic indicators according to the latest published results are as follows:

Table 1.3 Key Economic Indicators

	1993	1992
GDP ($ million)	35,865	35,457
GDP growth (per cent)	1.0	3.0
Inflation (per cent)	6.5	5.0
Trade surplus ($ million)	4,755	5,962

GDP = gross domestic product

Source: government figures,

MEED estimates

Preliminary figures released by the UAE Ministry of Planning indicated that all segments of the economy of the UAE with the exception of the oil sector, recorded further growth in 1993 for the fourth consecutive year. The GDP of the nation in 1993 rose by 1.08% to a level of 35.9 billion compared with $ 35.5 billion the previous year.(12) The atmosphere is most buoyant in Abu Dhabi. Despite federal government's announcement that public spending is being reduced in 1994.

More recent announcements in the newspapers are directed at the government efforts to privatise its infrastructure. According to Emirates law newsletter September 1994 edition that:

"The UAE is planning to end the government monopoly of various utilities (including ports, electricity, communications and other utilities) by way of a large scale privatisation program to provide the private sector with an opportunity to invest its funds locally instead of abroad. Privatisation plans could also cover hospital and airport services and manufacturing entities.

With the law establishing the UAE Stock Exchange expected to be published soon, the UAE Federal and local authorities are giving increased attention to various issues related to capital and securities markets which are currently outside the scope of the law. Examples are the lack of any rules on insider trading and on the offering of securities within the UAE by foreign companies. It will be interesting to watch developments in these areas particularly since more and more foreign companies are looking for investors in the Gulf states.

Of the six GCC states, only the UAE and Qatar have not yet established formal stock exchanges although Qatar is actively planning to open a formal stock exchange. Currently, shares are traded in the UAE informally on the telephone by local brokers on a matched bargain basis. There is little public information on the performance of the companies concerned and this is another area which is likely to change under the new regime. The local press has already reported that the law will require strict reporting for companies whose shares are traded on the exchange.

Whilst non-GCC expatriates have recently been allowed for the first time to invest in the stock exchanges established in certain other Gulf countries, notably Oman, Bahrain and Kuwait (on various terms and in some circumstances subject to residence and other restrictions), it does not appear to be the case, at least initially, in the UAE that even nationals of other GCC states will be permitted to trade on the UAE stock exchange.

Ultimately, the plan appears to be to link the exchanges of the six GCC states to create a regional market. In the meantime, Oman is to list Bahraini companies on its stock market soon according to the Director of the Muscat Exchange. Final approval is expected within the next few weeks. Bahrain and Oman signed an Agreement in 1992 to cross list shares before the end o f1994.(13)

According to Gulf News that the UAE Government plans to eventually open petrochemicals to private sector in 1995 according to the reporter. That "The much-anticipated privatisation of a number of major industries in Abu Dhabi, including the vast petrochemicals industry, is set to begin by the second half of 1995, according to the capital's chief industrialist.

"We have just approved recommendations by our consultants on privatising several major industries in Abu Dhabi," Sheikh Hamad Bin Tahnoun Al Nahyan, Chairman of the Abu Dhabi-based General Industry Corp (GIC), said yesterday.

Speaking to Gulf News, Sheikh Hamad said the GIC was in the process of submitting the just-completed report on the feasibility of privatising these projects to the Abu Dhabi Executive Council (EC) for consideration and endoresement.

He noted that privatisation of government-owned industries was the brainchild of Abu Dhabi Crown Prince and Deputy Supreme Commander of the Armed Forces Sheikh Khalifa Bin Zayed Al Nahyan, who is also EC chairman.

"Sheikh Khalifa has always been keen on allowing the private sector to play a broader role in Abu Dhabi's industrial projects and he has been following up the possibility of allowing nationals to buy shares in these projects," he explained.

Sheikh Hamad stressed the EC chief had expressed interest in transferring ownership of a number of industries run by the GIC, the Abu Dhabi government's industrial arm, to the private sector, but only when they became profit-making enterprises.

"When we first started, the cost of our industrial projects was extremely high and the market was moving downwards. Most of our projects were suffering losses and Sheikh Khalifa didn't want the private sector to take over a losing project," he explained.

But this situation has now changed, and all GIC-run industries have started to generate profit that covered both the initial cost of the project and the losses incurred in the early days of the projects, Sheikh Hamed Said.

He added that the feasibility study for privatisation covered all the existing industries operated by the GIC. Although he did not disclose any of the recommendations made in the report, he said the privatisation process will begin in the second half of 1995.

Privatisation would be beneficial for both the private sector and the GIC, he noted. "Currently we're busy operating the existing projects and we have no time to set up new ones. We will overcome this problem if the private sector gets involved," the GIC chief said.

The GIC, under the direction of Sheikh Khalifa Bin Zayed, also has other plans to encourage the private sector to venture into industry as part of the Abu Dhabi government's general tenor to diversify its sources of income from oil.

Sheikh Hamad disclosed that the GIC has just compiled a list of the 40 best industrial investment opportunities in the emirate's small, medium and large industries. "Feasibility studies for these projects will soon be made available to interested investors," he said.

"We want to direct the private sector to investment in fruitful industries that will boost the national economy... that's why we asked our consultants to select the 40 best industries from a list of more than 100 to be given to prospective investors," he added.

Sheikh Hamad also disclosed that the Abu Dhabi government had plans, besides, to open up the last petrochemicals industry to the private sector but only after the industry's infrastructure is completed.

"We will first set up big projects which the private sectors can build on to establish their own small and medium sized industries. We will focus on industries which don't need much labour and involve high technology and low consumption of water and electricity," he said.

Asked to comment on instructions issued by Sheikh Khalifa for the creation of three 'model' industrial cities in Abu Dhabi, Marfa'a and Al Ain, he said the GIC plans to send teams to neighboring Gulf states to study their industrial cities.

"We don't have any experience in model industrial cities so we are sending teams to Saudi Arabia and Oman to learn from their experiences in this field. We will also be looking at Singapore's expertise in industrial cities," the GIC chairman noted.

The first industrial city, to be located in Mussafah, is expected to be ready after two or three years, Sheikh Hamad said, noting that the tender for this massive project is still in the pre-qualification stage.

"Sheikh Khalifa has more or less chosen the location for the first industrial city in Mussafah with an initial area of four square kilometres that could be expanded to 16 square kilometers," he added.

He declined to disclose the exact location of the city, saying only that it would be a strategic location along the beach in order to allow investors to take advantage of access to the sea. A mini-port could later be built near the city, he elaborated.

Commenting on Sheikh Khalifa's approval of Dh 100 million in soft loans from GIC funds for national industrialists, he said that this was the first step towards setting up a fund for industrial activities similar to the Khalifa Committee for setting up buildings.

"Sheikh Khalifa himself said that his would be a start. If the beneficiaries make good use of the loans, a permanent fund would be set up and the amount would be increased from Dh 100 million," Sheikh Hamad noted.(14)

(c) Qatar

The Qatari economy remains overwhelmingly dependent on oil revenues with more than 90% of its export earnings deriving from this source. The oil price crash in 1986 lead to an unprecedented decline in economic activity in the country with gross domestic product falling by 21% on 1985 levels. Austerity programmes pursued by the government have helped to lessen the subsequent impact of these reversals to stabilise economic performance and plan for future developments.

The government is heavily involved in the country's commerce and industry as the economy is vulnerable to outside forces. It is however stated government policy to promote the private sector and to enter only those fields for which private capital is not available or those where government participation is believed to be in the national interest.

Economic activity within the country is directly related to government spending on infrastructure development. The unpredictability of oil prices has meant that the level of such development has been subject to tight budgetary control. (15)

Key Economic indicators according to the latest published results are as follows:

Table : 1.4 Key Economic Indicators

	1993	1992
GDP ($ million)	7,143	7,473
GDP growth (per cent)	3.0	8.6
Inflation (per cent)	2.0	3.1
Trade surplus ($ million)	1,099	1,825

GDP = gross domestic product

Source: Government figures,

MEED estimates

A 10 percent cut in public spending has been announced in 1994. The government is looking at new ways of financing spending. These include issuing treasury bonds and tapping private finance for infrastructure and industrial projects.

Public projects are still going ahead, but large scale infrastructure schemes are rare, except in the industrial sector. About $3,000 million-worth of contracts have been awarded over the past 12 months in the natural gas development programme. The majority are being financed by international banks and export credit agencies.

The success in securing credit for this programme is encouraging the government to examine the possibility of mobilising bank credits for general infrastructure work. This could include the planned new international airport, the sewerage system and leisure schemes.

For these reasons confidence in the economy of the country is reasonably high this summer. Business people believe that Qatar has good long-term potential and are prepared to tolerate a short-term dip in economic activity in the private sector and some delays in payments from government. (16)

(d) Bahrain

Bahrain, the first country in the Arabian Gulf to discover oil (in 1932), subsequently used its oil revenues to build up an advanced infrastructure well ahead of its neighboring Gulf states.

However, oil resources are limited by comparison to other Gulf states and, since the mid 1970s, the government has tried to encourage new investment to diversify the economic base. In this regard, Bahrain has achieved some measure of success. Alternative industries have been developed, such as aluminum manufacture, ship repairing and medium-size light industries. In addition, Bahrain has emerged as a major regional banking and financial centre, with particular emphasis on offshore banking activities.

There is a liberal business environment and the government is keen to attract foreign private investment, which currently accounts for up to 25% of gross domestic product. In the commercial sector, trading concerns and corporate entities operating in Bahrain are normally required to have 51% Bahraini ownership, but the Commercial Companies Law does permit the registration of "exempt companies".

The government's oil interests are managed by the Bahrain National Oil Company (BANOCO) whose onshore production is presently 42,000 barrels per day. In addition, BANOCO shares the offshore Abu Shaafah field with Saudi Arabia.

Bahrain is very active in downstream oil activities and in 1980 the government acquired a 60% stake in the Bahrain Petroleum Company (BAPCO), which manages an oil refinery. BAPCO currently refines approximately 250,000 barrels per day of crude oil from Saudi Arabia.

The government also exploits its considerable volume of gas reserves through its 75% interest in the Bahrain National Gas Company (BANAGAS). In 1987, production reached 3,300,000 barrels of liquefied petroleum gas, and these relatively cheap supplies have encouraged the development of further petrochemical and other energy-intensive industries.

Key economic indicators according to the latest publishing results are as follows:

Table: 1.5 Key Economic Indicators

	1993	1992
GDP ($ million)	4,521	4,225
GDP growth (per cent)	6.2	4.6
Inflation (per cent)	1.0	-0.3
Trade surplus ($ million)	-136	-799

GDP = gross domestic product

Source: Government figures,
MEED estimates

New initiatives are beginning to pay off for the GCC country with the least energy resources. Efforts to promote small and medium-size industries, some successes in attracting foreign companies and the development of capital markets are helping to underpin confidence.

Results show that the private sector is largely in profit and expanding. Consumer confidence is high, and the Bahrain Monetary Agency (BMA - central bank) has asked local banks to reduce personal lending. This follows an expansion in consumer lending to BD 265 million ($ 703 million) in 1993, a rise of 59 per cent compared with 1991.

Medium-size projects are coming on the market on a regular basis. Tourism and business service industries are making progress. The big prospect for the future is the continuing expansion of Aluminum Bahrain (Alba), which has announced plans to invest $250 million in new facilities, and the hope that Bahrain Petroleum Company (Bapco) will finally implement its modernisation programme. (17)

1.1.1.2 The accounting profession

(a) Saudi Arabia

The accounting profession is controlled by the Ministry of Commerce, which issues licences to qualified individuals and associations of qualified individuals. There are approximately 200 licensed accountants in Saudi Arabia.

The development of the profession is being influenced by the following guidance from the Ministry of Commerce:

- the introduction of Saudi Arabian Accounting Concepts and Objectives;
- the introduction of Saudi Arabian Auditing Standards;
- the advancement of the Saudi Accountants Association; and
- a requirement that 20% of an accountant's technical staff must be composed of Saudi nationals.

In 1982, the General Auditing Bureau, a Government office, issued comprehensive auditing standards. The development of the profession in Saudi Arabia in the view of the researcher has proceeded at a very slow pace compared to other parts of the world.

The accounting profession offers a wide range of services, from sole practitioners providing book-keeping services to a full range of services provided by international firms. Most of the largest international firms have affiliations with local firms.

(b) United Arab Emirates

The accounting profession is well represented in the United Arab Emirates, with most of the large international accounting firms maintaining offices in the major centres. The registration of accountants and auditors is governed by Federal Law No. 9 of 1975. There is no local professional body of accountants.

(c) Qatar

All limited liability companies with capital exceeding QR 500,000 and all public shareholding companies should have auditors appointed by the general assembly every year. There is no accounting body which issues specific guidelines on auditing and accounting matters. It is normal for international audit firms to recommend the application of International Accounting Standards to financial statements.

(d) Bahrain

There are no organisations formally responsible for formulating accounting principles, auditing standards or professional ethics in Bahrain. Auditors are expected to follow International Accounting Standards and best industry practice (18).

There exists, however, the Bahrain Society of Accountants and Auditors, whose membership is open to all accountants working in Bahrain.

By law, companies in Bahrain are required to maintain the accounting books and records necessary to reflect properly both the company's operations and its financial status, and to allow the preparation of an annual balance sheet and income statement.

The Commercial Companies Law of 1975 requires all corporate entities to maintain the following statutory registers:

- a register of shareholders;
- a register of minutes of directors' meetings; and
- a register of debenture holders.

There is no requirement concerning where accounting records should be maintained or the particular language to be used. Normally, the books and accounting records are maintained in English or Arabic.

1.1.1.3 Education

(a) Saudi Arabia

There are six universities in Saudi Arabia distributed across the Kingdom as follows:

City	University	Year established	Language of instruction
Riyadh	King Saud University	1957	Arabic/English
	Mohd Bin Saud Islamic University	1974	Arabic
Jeddah	King Abdul Aziz University	1967	Arabic
Dhahran	Petroleum Mining University	1963	English
Medina	Islamic University	1961	Arabic
Ihsa/Dammam	King Faisal University	1975	Arabic/English

Although all levels of education are free for Saudi nationals, foreigners working in Saudi Arabia do send their children to private community and international schools.

Because of the diversity of the foreign population, American, British, French and other ethnic schools are available in Alkhobar, Riyadh and Jeddah. Usually operated by experienced headmasters recruited from the home countries, these schools rely almost exclusively on qualified foreign staff.

(b) United Arab Emirates

A comprehensive network of government schools provides free primary and secondary education to UAE nationals. Two universities in Al Ain and Ajman offer programmes through the graduate and post- graduate levels in a wide range of subjects in both Arabic and English languages.

The major urban centres have private English and American schools staffed by expatriate teachers. There are also German, French, Japanese and Dutch schools.

(c) Qatar

The Ministry of Education was the first ministry to be established. A primary system began in 1956, intermediate in 1958 and secondary in early 1960s. In 1973 the Higher Teacher Training College was founded. Qatar University was established in 1977. The university has the most up-to-date facilities and includes specialist centres for scientific, technical and educational research.

(d) Bahrain

There are various Government schools, colleges and university in Bahrain with Arabic and English as the medium of instruction. In addition, there are a number of private institutions offering training and training in computers and accountancy.

1.1.1.4 Economic Perspective of the GCC States

Having weathered in disruption of the Gulf war in early 1991, the six states of the Gulf Co-operation Council are now preparing for an economic revival. With their wealth of oil and gas, and with the prospect of rising world demand for energy in the mid-1990's they are well placed to earn substantial revenues that should benefit both the public and private sectors wrote Pamela Ann Smith in a recent MEED market survey on the Gulf Consumer Markets. Revenues from these hydrocarbon exports already provide more than 90 per cent of government earnings in most of the Gulf countries and, when oil-and energy-related industries such as petrochemicals, fertilisers and aluminum are added, account for the largest share by far of their gross domestic product.

Recent Gulf News report indicated that the GCC posted 5.6 percent gross domestic product GDP growth in 1993. According to the article:

"The economies of six Gulf states grew by more than five per cent in 1993 despite a decline in their oil earnings due to weak crude prices, according to an official report.

The Gross Dometic Product (GDP) of the six-national Gulf Cooperation Council (GCC) stood at $201.1 billion in 1993 compared with $190.4 billion in 1992, an increase of 5.6 per cent, the Gulf Organisation for Industrial Consultancy (GOIC) said in its annual report.

A breakdown showed all members recorded positive growth rates although they widely varied due to fluctuation in oil production and other sectors.

Kuwait recorded that highest growth rate of nearly 32.1 per cent, with its GDP rising to $28.7 billion in 1993 from $21.7 billiion in 1992.

The Doha-based group gave no reason for the sharp growth but economists attributed it to a large increase in oil output after the emirate completed repair of its oil sector that was badly damaged by the Iraqi invasion.

According to the Organisation of Arab Petroleum Exporting Countries (Oapec), Kuwait produced an average 1.8 million bpd in 1993 compared with one million bpd in 1992 and 179,000 bpd in 1991.

Saudi Arabia, whose oil production of eight million bpd accounts for nearly 12 per cent of the world's, recorded a low growth rate of 1.9 per cent. Its GDP rose to around $113 billion from $110.9 billion.

The UAE, the second biggest Arab oil producer, registered a similar rate, with its GDP growing to $35.89 billion from $35.2 billion in the same period, according to GOIC, which advises on the industrial policies of member states.

The other members Oman, Bahrain and Qatar also recorded positive growth rates in 1993, the report said.

Although the total GCC growth rate was higher than the world average, it remains far lower than growth levels achieved during the oil boom of the late 1970s and early 1980's. Most GCC states had reported their economies grew by as high as 10 to 15 per cent a year due to massive investment in the infrastructure.

But some of them started to record negative rates when oil prices began to decline in the mid 1980s. This has prompted most members to launch industrial drives and carry out reforms, including privatisation.

According to the GOIC, industrial output has steadily grown over the past few years due to large investments, which exceeded $37 billion.

From $12.8 billion 1987, the output increased to $14.1 billion in 1990 and $16.5 billion in 1992. Other non-oil sectors like trade construction and agriculture also recorded an upturn.

Writing in the annual report, GOIC Secretary General Abdul Rahman Al-Jaafari said the GCC's main economic indicators were positive in 1993 and actual budget deficits were lower than in 1992 despite a drop in income.

A report by the Kuwait-based Oapec showed oil earnings of the six GCC states fell to $72.7 billion in 1993 from $76.8 billion in 1992. Crude prices averaged around $16.33 in 1993 and $18.44 in 1992".(19)

Together, the six states of the GCC-Saudi Arabia, Kuwait, Bahrain, Qatar, the United Arab Emirates (UAE) and Oman- possess almost half the world's proven reserves of crude oil and more than 15 per cent of its reserves of natural gas. Combined GCC exports of crude oil is estimated to more than $61 billion in 1994 alone and accounted for an impressive 37.9% of total world oil imports. As shown in the following Tables:

Table 1.6: Estimated world oil output, 1993

	1993	1992
OPEC (crude only)	25.0	+2.9
OPEC including NGL and condensate	27.3	+3.0
America	13.9	-1.2
Europe	5.0	+5.0
Non-OPEC Africa/Middle East	3.7	+3.6
Far East	5.2	+2.5
Former Soviet Union	7.8	-13.1
Non-OPEC NGL	3.1	+0.3
World total	66.0	-0.1

Source: Petroleum Intelligence Weekly, New York, 24 January 1994
MEED - 4 February 1994

Table 1.7: GCC: Oil export revenues 1990 - 1995

	1990	1991	1992	1993(e)	1994(e)	1995(f)
	---------- ($ billion) ----------					
United Arab Emirates	15.6	14.8	14.1	12.1	11.3	11.9
Bahrain	3.2	3.0	2.6	2.4	2.3	2.4
Saudi Arabia	40.1	43.7	40.0	34.0	31.5	33.4
Oman	4.8	4.2	4.6	4.2	4.0	4.2
Qatar	3.2	2.8	3.4	2.8	2.6	2.8
Kuwait	6.3	0.9	6.2	9.9	9.5	10.4
	73.2	69.4	70.9	65.4	61.2	65.1

Sources: IMF, World Bank, Local Central Banks, BIS.
Middle East Monitor (MEM) September 1994
e/f = MEM estimates/forecasts

Oil prices rose dramatically in the wake of the Iraqi invasion of Kuwait in August, 1990, reaching more than $40 a barrel at one point. They fell back somewhat once the Gulf war ended, but most industry observers expect that they will average between $14 and $18 a barrel for the remainder of 1994. Table 1.8 give a historic account of the fluctuation in oil prices as follows

Table 1.8: Spot Crude Prices US Dollars per barrel

	Arabian Light/Dubai $/bbl	Forties/ Brent $/bbl
1972	1.90	-
1973	2.83	-
1974	10.41	-
1975	10.70	-
1976	11.63	12.80
1977	13.38	13.92
1978	13.03	14.02
1979	29.75	31.61
1980	35.69	36.83
1981	34.32	35.93
1982	31.80	32.97
1983	28.78	29.55
1984	28.07	28.66
1985	27.53	27.51
1986	12.97	14.38
1987	16.92	18.43
1988	13.22	14.96
1989	15.69	18.43
1990	20.50	23.81
1991	16.56	20.05
1992	17.21	19.37
1993	14.90	17.07

Source: Platt's

June 1994 - 15.67 16.58

MEED

Average production and volume of export in most GCC states have been carried out on a consistent basis since 1991 as shown in the table below:

Table 1.9: GCC: Volume of export of crude oil and petroleum products 1990 - 1995

	1990	1991	1992	1993(e)	1994(e)	1995(f)
	---------- (million b/d) ----------					
United Arab Emirates	2.29	2.60	2.49	2.44	2.42	2.45
Bahrain	0.11	0.11	0.11	0.14	0.14	0.14
Saudi Arabia	6.68	8.23	8.49	8.13	8.03	8.20
Oman	0.66	0.70	0.74	0.75	0.75	0.75
Qatar	0.46	0.44	0.49	0.50	0.49	0.51
Kuwait	1.20	0.18	1.07	1.95	2.00	2.10
	11.4	12.26	13.39	13.91	13.83	14.15

Sources: IMF, World Bank, Local Central Banks, BIS.

Middle East Monitor (MEM) September 1994

e/f = MEM estimates/forecasts

Proved GCC states oil reserves at end of 1993 according to BP statisitical review of world energy dated June 1994 is summarised in the table below:

Table 1.10: Proved Reserves at End 1993

	Billion Tonnes	Billion Barrels	Share of World Total
United Arab Emirates	12.9	98.1	9.7%
Bahrain	-	-	-
Saudi Arabia	35.5	261.2	25.9%
Oman	0.6	4.7	0.5%
Qatar	0.5	3.7	0.4%
Kuwait	13.3	96.5	9.6%

Source of data: The estimates contained in this table are those published by the Oil and Gas journal in its issue of 27th December 1993.

The above figures of proved reserve do suggest that the economies of the GCC states particularly Saudi Arabia, United Arab Emirates and Kuwait whose economies are heavily dependent on oil will continue to enjoy the oil revenues for many decades to come.

One major factor to consider is the continuing demand for oil at prices which will maintain and improve the cash flow position of these countries to enable them to implement their development programmes including the implementation on a countrywide basis of automation and information technology.

1.1.1.5 Economics of the Region A Historical Overview

The thirst for information technology particularly the use of computers in the Middle East is no different from the rest of the world; particularly in the Gulf states where the general purchasing power is generally higher than anywhere else in the Middle East.

The six GCC states have small populations, especially in comparison to other developing and/or Arab countries. The wealth created by their oil and gas exports has helped to give them some of the highest per capita incomes in the world. The UAE leads the list, with an annual income of $16,860 a year in 1994 (the last year for which official figures are available). Prior to the invasion, Kuwait ranked second, with a figure of $13,400. As a result, most GCC countries have incomes that compare with the more advanced industrial countries in Europe: the UAE, for example, is projecting an annual income of $17,050 in 1995 ahead of Qatar which is projecting an annual income of $13,910.

While per capita income has of course fallen dramatically in Kuwait, it should be remembered that the government used to have at its disposal some $100 billion in assets invested abroad. Private sector investment overseas by Kuwaitis is also high, with estimates ranging from $20 billion to $40 billion. There is therefore every likelihood that as reconstruction gathers pace, per capital incomes in Kuwait will rise substantially, gradually approaching their pre-invasion highs.

Table 1.11: Gross Domestic Product per person (US $)

	1990	1991	1992	1993	1994	1995
	---------- (US $) ----------					
United Arab Emirates	18,005	17,482	17,560	17,260	16,860	17,050
Bahrain	8,028	7,971	7,920	8,230	8,280	8,450
Saudi Arabia	7,040	7,850	8,060	7,850	7,420	7,220
Oman	6,915	6,433	7,060	6,940	6,620	6,820
Qatar	15,020	15,170	16,100	14,010	13,760	13,910
Kuwait	N/A	N/A	N/A	N/A	N/A	N/A

Source: Middle East Monitor, September 1994.

N/A = not available

According to the Arab League (20) the distribution of population by age group in these countries seems to indicate that over 30% are below 14 years of age as follows:

Table 1.12: Estimate of Population by Age Group in the Gulf States

	Total population (in thousands)		% distribution by age group		
	1990	2000	0 - 14	15 - 64	Over 65
	----------Year----------				
U.A.E.	1,592	1,979	31.1	67.3	1.7
Bahrain	497	626	32.8	65.2	2.0
Saudi Arabia	14,126	20,335	45.3	52.1	2.6
Oman	1,517	2,125	45.5	52.0	2.5
Qatar	389	523	34.9	63.4	1.8
Kuwait	2,063	2,782	39.0	59.6	1.5

The need for information technology and computers in the Gulf states is greater than other regions in the Middle East when one considers the number of foreign professional and expatriates occupying jobs in the Gulf.

Emphasis on education in the Gulf has been predominant over the last few years particularly in introducing computers to colleges and universities. Recent article in the Gulf newspapers describe the pride the United Arab Emirates government takes in offering laptop computers to students. Students at the higher colleges of technology in the United Arab Emirates have access to over 120 Apple Macintosh and IBM compatible computers in the colleges.

The economic future of the Arab Gulf states is highly dependent on oil. According to OAPEC (21) there is an ample reserve of oil supply to cover the revenue needs of the future for these countries.

In government, businesses and education the fiscal impact of the drop in oil prices on the gross domestic products of the Gulf states can best be described in the following table (22):

Table 1.13: Gross Domestic Product of Gulf States (in US $ billion at Current Prices) Latest Figures

	1990	1991	1992	1993	1994(e)	1995(f)
	---------- ($ billion) ----------					
United Arab Emirates	33.7	33.9	35.5	35.9	35.9	37.2
Bahrain	3.9	4.0	4.1	4.3	4.4	4.5
Saudi Arabia	104.7	115.3	121.5	121.6	118.0	118.3
Oman	10.5	10.2	11.6	11.8	11.7	12.5
Qatar	7.4	6.7	7.2	7.4	7.4	7.7
Kuwait	25.5	16.1	24.2	29.6	28.9	30.9

e/f = MEM estimate/forecast

Source for historical date: IMF, World Bank, BP, Local Central Bank

It can be seen from the above table that the gross domestic product in 1994 for these countries when compared to 1993 in real terms has not improved.

The decline in oil prices had direct and significant impact on the development of the Gulf states. International supply and demand for oil has fluctuated wildly, as at the price per barrel. The average price was US $1.30 a barrel in 1970, US $34.32 in 1981, US $14.90 in 1993 and US $15.67 in June 1994.

1.1.2 Technical Aspiration of the Countries in the Region

1.1.2.1 Introduction

The invention of the computer can be viewed, simply as the most recent stage in the history of information technology. More than 2,000 years ago, the creation of the alphabet by the ancient Greeks provided a method by which information could be moved from one place to place independently of the person who produced it. Fear was expressed at that time the use of the alphabet would ultimately reduce the ability of people to remember information. Instead, the alphabet provided strong impetus to commerce and discovery, as well as to the scholarship and creative writing of the Greeks and Romans.

Similarly, when Gutenburg invented the printing press in the 15th century it was broadly suggested that the skill of handwriting would be lost to the printed word. What actually happened was that printing technology produced books at such dramatically reduced cost that it aided the industrial revolution and hastened the arrival of universal public education.

The computer, in the same tradition, has taken the processing of information. Another significant step forward now, anyone with a computer and attached printer can create and publish materials without the need for printing press. Of greater importance, however, the computer can function as an extension of the human mind by providing information storage and retrieval of almost infinite capacity. Many important human problems, such as the prediction of life threatening weather systems, that previously were virtually impossible to solve are now being handled easily, with the aid of computers. Further, computer automation and robotics are revolutionising the workplace, and providing dramatic increases in productivity. If this progress continues, as is generally expected, there is reason to believe that by the year 2000 most employed people will use computers in one capacity or another (23).

Because the Middle East and particularly the Gulf states are becoming increasingly dependent upon computer technology, it is not surprising that the League of Arab States carried out a special regional conference in Tunis in November 1984 to determine strategies and to set policies for information (24).

The committee began meeting on 4 November 1984 to determine its plan of action. The member countries' chosen for the study included Jordan, Kuwait, Morocco, Iraq, Bahrain, Tunis and Algeria.

1.1.2.2 Historical Background

In an attempt to decentralise some of its activities, especially those connected with development, Arab league, decided in its tenth general meeting, in November 1980 to establish a regional centre for development in the Arab world. The centre would be similar to other centres which were established by the efforts of the organisation for the promotion and development of information. This project was part of the activities which the governments league continued to undertake to develop better cadres in the member states by contributing to the increase of the necessary skills and experiences.

1.1.2.3 Objectives

Because of the need to develop the information media technology at all levels within the Arab League it was decided to establish a regional centre within the League to meet its objectives. Therefore it was necessary to conduct a preliminary study on the establishment of such centre. The study was aimed at meeting the following objectives:

- To determine the needs for development in the countries in the region.
- To determine the type of development needed to satisfy these needs.
- To control the organisational features of the proposed centre.
- To determine priorities for the centre.

1.1.2.4 Methodology

The governments information league requested that a team of the Arab experts should carry out the preliminary study. The three experts came from Jordan, Iraq and Tunis, and they were chosen by the information authorities in their respective countries. They have co-operated as experts for the governments information league, and their work does not necessarily reflect their governments policies in any way.

In their first meeting on the 3 - 4 May 1982, members of the team were able to determine the importance of the intended study and to present a schedule for it.

They gathered the necessary information to determine the centre's activities during their technical consultations with the authorities while traveling through the countries of the region (25). The information gathered is connected with the following situations:

- The current organisational structure and the organisation of those who work in the information field.

- The current situation in the information field: Field of activity, application and the equipment used.
- Current needs for the development of information.
- Possibilities for exchanging expertise.

1.1.2.5 The Status of Information Technology in the Arab World

It has been recognised by the Arab League that the information technology and the activities connected with it is of great importance to all the Arab countries, at various levels. This situation, at the same time, applies to equipment (hardware) and application. The capabilities of the available equipment and the various types of applications used shows to what extent the Arab countries are in need for information technology.

This can possibly be related to the lack of sufficient expertise in the information technology field, which is essential to meet the required objectives in a satisfactory manner. Seven Arab countries were chosen to carry out a study to evaluate the status of the information media in the region to evaluate the requirements and needs which the proposed centre can fulfill. In the following paragraphs results of the study are given.

1.1.2.6 Applications

According to the aforementioned study the computer applications already in use may be summarised as follows:

- Commercial applications: Salary schedules, employee lists, accounts, information system, records, etc.
- Scientific applications: Engineering, new ideas, statistical and mathematical problems, research, etc. amounts to 15% of all applications.
- Special applications amounts to 5% of all applications.

1.1.2.7 Employees

Those who are working in the information technology field, and were covered by this research belong to the following categories:

	Category	Percent
-	Application	6%
-	System analysis	5%
-	Programming	30%
-	Equipment utilisation	15%
-	Gathering information	43.5%
-	Maintenance	0.5%
		100%

The above figures exposed a serious shortage in the number of specialists in the areas of systems analysis and maintenance engineering.

1.1.2.8 Current Development Capabilities

The aforementioned study showed that most countries in the region have development and training capabilities, but actual basic development were experienced in the following fields:

(a) Official courses organised by development centres and academic institutions:

- Systems analysis
- Programming
- Data gathering
- Operations
- Orientation
- Other related matters.

(b) Courses arranged on request basis in some countries, presented by foreign specialists:

- Systems offering basic information
- Introducing written systems
- Maintaining equipment
- Documentation

These courses were offered in most cases by organisations from outside the region.

(c) Courses given by computer hardware and software suppliers often concentrated on a specific subject and for a short duration, as follows:

- Operating systems
- Programming aids
- Operations

Table No. 1.14 shows the distribution of information technology development courses in the seven countries being studied.

Table No. 1.15 points to the number of centres and organisations or academic institutions which offer technical development and professional development in information technology in those countries.

Table 1.14: Distribution of Information Technology Development Courses in Seven Countries Being Studied by the Arab League

Courses	Kuwait	Bahrain	Jordan	Iraq	Tunisia	Algeria	Morocco
System Analysis	X	X	X	X	X	X	X
Programming	X	X	X	X	X	X	X
Data Entry	X	X	X	X	X	X	X
Operations	X	X	X	X	X	X	X
Orientation	X	X	X	X	X	X	X
Operational Systems	X	-	-	X	X	-	-
Written Systems	X	-	-	-	-	-	-
Maintenance Engg.	-	-	-	X	-	X	-
Others	X	X	X	X	X	X	X

Source: League of Arab States General Secretariat Documentation and Information Centre, 1984.

Table 1.15: Number of Centres and Organisations or Academic Institutions Which Offer Technical Development and Professional Development in Information Technology

Countries	Governments	Private Sector
Kuwait	4	8
Bahrain	1	3
Jordan	4	5
Iraq	1	-
Tunisia	4	-
Algeria	7	-
Morocco	2	-

Source: League of Arab States General Secretariat Documentation and Information Centre

1.1.2.9 Analysing the Needs of Arab Countries for Development

It was apparent to the investigating team that the basic development in the information media has already taken place in the region. The aim of basic development in most of the Arab countries was aimed at preparing staff on the technical and semi-technical levels. There were some developments which approached high training. They were offered by several centres in the region, such as academic institutions. Practical development according to the investigating team was generally lacking at all levels. The Arab League Information Committee also noted that there was more demand for specialisation at very high levels, which was non-existent or almost non-existent at the present time in the area of systems analysis and maintenance engineering.

According to the Arab League Information Committee this finding is material in its nature since it illustrates clearly the exact needs for development in the region. This was also illustrated clearly in the study of the countries chosen, for example the analysis of the information gathered indicates that the solution offered as an answer to the needs mentioned above should not have been limited to the development of those in the information technology, but should have also gone far enough to cover the preparation of trainees and developers in this field too. The objective here is to achieve a gradual satisfaction of all the needs of the development in information technology in the Arab world. The study on the other hand illustrated the need for exchanging information technology within the region and for publishing that information, especially the part which relates to information technology development.

1.1.2.10 Areas of Development

According to the Arab League Information Committee, the study illustrated clearly that there was a definite need for development in the following areas:

- The administration of information centres
- The delivery of basic information
- Communication
- Merged delivery systems
- Interconnection engineering
- Micro-computers and information
- Engineering (maintenance and application)
- Systems programming
- Projects operation technology
- The invention and development of written systems
- Advanced technology in systems development.

The stage was set in 1982 and 1984 for the Arab League to influence the introduction of computers in the Arab world. The major purpose of the Arab league conference on the status of information technology in the Arab world was to ensure that Arab countries will be adequately prepared to take advantage of the advancement in information technology and to be prepared to meet the challenges of tomorrow. Unfortunately, no follow-up report and study was issued to determine whether the goals of the conference where achieved. However the cost of micro-computers has since 1984 conference dropped substantially and the quality of computer software has improved dramatically which enabled a larger number of Arab users to acquire the required hardware and software and to use it at work and in their homes. There also is growing evidence that computers in the hands of well trained professionals do enhance their usefulness in all areas of applications. In a recent article on computing in the Sunday Times (26), Jane Bird reported that "computers are shrink-ing in size and exploding in performance. In the 1960s they were the size of rooms and had to be kept in air-conditioned environments. Today they can be bought of the shelf and installed on the desktop."

1.1.3 Western Influence on the Region

1.1.3.1 User's perspective

When computers arrived on the scene in the region in the 1970's, many foreign organisations operating in the region knew the benefits of computerisation from their experiences back at their parent companies headquarters but were hesitant to go in for their own computers. Service bureaus thrived at the time offering computing facilities in their premises (27).

A variety of organisations are finding that despite their high initial costs, computerisation holds the key to improved efficiency needed for survival.

The Gulf region by virtue of its wealth has since the introduction of computers in the region and the oil boom of the seventies attracted some of the major transnational corporations' computer companies, accountancy and information technology firms. (28)

Technology is a major source of economic growth and development. The importance of transnational corporations in the generation, application and international transfer of technology is undisputed. When examining the technological impact of service provided by Trans National Corporations (TNC) it is important to distinguish between technologies which are embodied in plant, equipment and industrial processes ("hard" technology) and technologies which consist mainly of know-how, management, marketing, technical, professional and other skills ("soft" technology) (29).

Human capital in the form of highly skilled employees, is unlikely to move to a large degree from a country rich in that resource to host countries deficient in that resource as is the case in the Gulf. In this case, transnational corporations especially in developing countries, have to invest in the training of host country employees, because the nature of the industries require relatively high level of skills. While some of the training provided may be specific to the investing firm, some of it is likely to spread, with the turnover of employees, to indigenous firms. A possible side effect of this situation is that foreign investors may compete too strongly for the host country's limited supply of skilled or educated labour and therefore, make it difficult for local firms to grow in this type of industry (30).

The use of computers is the most rapidly and extensively accepted technological development. Starting in 1948 with the first delivery of IBM 604 (which was a calculator and not a complete computing system), computers are now being used in almost every conceivable place where data are manipulated, in small firms and large (31).

1.1.3.2 Hardware and software companies

Western influence in the Gulf in terms of introducing information technology is represented by the various subsidiaries, agencies and representatives of major transnational corporations operating in the region. The range of services provided by these companies include the supply of hardware and software, training of client personnel and management consultancy services.

The tables below show the top European IT companies and the world leading computer companies operating in the Middle East either directly and/or through agents. (32)

Table 1.16: Top European IT Companies

Rank	Company	1993	1992	% Change
		------Revenue ($ m)------		
1	Siemens Nixdorf	7,225.5	8345.1	-13.4
2	Olivetti	5,070.2	5,762.0	-12.0
3	Groupe Bull	5,000.0	5,715.1	-12.5
4	ICL	3,915.7	4,354.8	-10.1
5	Cap Gemini	1,946.9	2,252.9	-13.6
6	Finisiel	1,027.5	1,200.0	-14.4
7	Sema Group	749.3	732.3	2.3
8	Comparex	736.4	731.9	0.6
9	British Telecom	731.3	857.6	-14.7
10	Getronlos	703.8	584.3	20.5

Source: DATAMATION (July 1994)

And the leading information suppliers who have presence in the Gulf

Table 1.17: Leading Computer Companies

1993 Rank	1992 Rank	Company	1993 IS Revenue	1992 IS Revenue	% Change
1	1	IBM	62,716.0	64,520.0	-2.8
2	2	Fujitsu	21,871.9	20,142.2	8.6
3	3	NEC	16,674.8	15,395.0	8.3
4	5	HP	15,600.0	12,688.0	23.0
5	4	Digital	13,637.0	14,162.0	-3.7
6	6	Hitachi	12,629.1	11,352.0	11.2
7	7	AT&T	9,860.0	10,450.0	-5.6
8	10	Toshiba	8,819.7	7,448.7	18.4
9	15	EDS	8,507.3	8,218.9	3.5
10	11	Apple	7,900.0	7,173.7	10.1
11	8	Siemens Nixdorf	7,225.5	8,345.1	-13.4
12	9	Unisys	7,200.5	7,832.0	-8.1
14	12	Olivetti	5,070.2	5,762.0	-12.0
17	13	Groupe Bull	5,000.0	5,715.1	-12.5
18	19	Sun	4,493.0	3,832.0	17.2
20	17	ICL	3,915.7	4,354.8	-10.1
45	27	Amdahl	1,680.5	2,524.7	-33.4
55	44	Data General	1,059.5	1,100.8	-3.8

All figures are in US$m

Source: DATAMATION (June 1994)

The above firms' history is well documented and their contribution in the region stems from their self interest and profit motives.

1.1.3.3 Software suppliers

Most software currently purchased in the Gulf by governments, commercial users and educational institutions is from local suppliers or in certain circumstances directly from developers and publishers. The table below is a summary of the top ten major transnational software suppliers operating in the Gulf directly or through an intermediary.

Table 1.18: Top Ten Independent Software Vendors Operating in the Gulf Region Directly and Through Agents

Company Name	Revenue $million	Net Income $million	4 Qs ended	Founded	Emplo-yees	Principal products
Microsoft Corp	4395.00	1049.00	Mar '94	1975	14430	PC operating systems languages, applications
Computer Associates	2054.79	341.58	Dec '93	1976	7215	Multiplatform systems, data management & applications
Oracle Corp	1808.68	238.34	Feb '94	1977	5247	Database management
Novell Inc	1174.41	-33.23	Jan '94	1983	4429	Network operating systems
Lotus Develop-ment Corp	981.17	55.54	Dec '93	1982	4738	PC and network applications
WordPerfect Corp.	707.09	N/A	Dec '93	1979	4800	PC applications
SAP AG	657.4	87.40	Dec '93	1972	3450	Midrange & high end application suites
Software AG	509.60	33.30	Dec '93	1969	4396	Tools & applications for manufacturing & finance
Dun & Bradstreet	478.0	N/A	Nov '93	1990	2600	Multi-platform business applications

Source: Arabian Computer news
Volume 9, no 10, October 1994

The most recent entry into the Middle East market when it stormed into market with world beating client/server applications is SAP.

SAP is the leading provider of client/server business application solutions in the world today. Ranked as the number seven independent software vendor in the world, the company is well on the way to turning over US $1 billion the 1994 financial year. And now SAP has turned its attention to the Middle East market with the opening of offices in Jeddah and Dubai and the creation of SAP Arabia.

50 people have already been committed to the Middle East region who will be working to bring the SAP expertise in client/server applications to the region. The company has also opened a dedicated Arabic Competence Centre which will be responsible for the Arabisation of its core business applications and will soon be opening offices in Cairo and Casablanca to be closer to its customers in the Arab world.

SAP believes that the proven SAP software products alone are not enough to guarantee the company's success. The quality of customer service in consulting, training and marketing are just as important. From the beginning, SAP Arabia decided to concentrate its efforts to satisfy its Arabic customers through first class customer service. To achieve this goal SAP Arabia will not just count on the expertise of its 50 staff in the region, it will also tap into the worldwide network of external SAP consultants.(33)

It should be noted that there are also a number of Asian satellite software houses operating in the region through local agents and computer hardware suppliers.

1.1.3.4 Accounting profession

Diversification is also prevailing in the accounting industry. the largest United States accounting transnational companies, in particular, have in recent years increasingly diversified into management consulting, corporate finance consulting, in particular, and the use of data technologies, now account for about one-fifth and up to half of their total fees or chargeable hours, compared with only 12 percent a decade ago (34).

The expansion of those companies into this new area has been so dynamic that their market share in all management advisory services in the United States of America and the UK grew from an insignificant figure to nearly one-third of the market by the mid-1980s (35). As a result over half of the top ten management consulting firms in the United States of America and the UK are no longer primarily management consulting firms as shown below:

Table 1.19: Top Ten Leading Accounting Firms in the US - FEEDATA

Firm	1993 Fee Income ($/m)	1992 Fee Income ($/m)	Growth Rate (%)	Effective Date
Arthur Andersen & Co, SC	2,922	2,680	9	31/08/93
Ernst & Young	2,351	2,281	3	30/09/93
Delotte & Touche	2,055	1,955	6	31/05/93
KPMG Peat Marwick	1,822	1,800	1	30/06/93
Coopers & Lybrand	1,642	1,557	6	30/09/93
Price Waterhouse	1,430	1,370	4	30/06/93
Grant Thornton	224	222	1	31/07/93
McGladrey & Pullen	197	189	4	30/04/93
Kenneth Leventhal & Co.	193	188	3	30/09/93
BDO Seldman	182	182	0	30/08/93

Source: International Accounting Bulletin
September 1994

Table 1.20: Top Ten UK Firms Fee Income Split 1994

		Aud/Acc	Tax	Consultancy	Insolvency	Other
1	Coopers & Lybrand	45.2	21.6	22.1	11.1	-
2	KPMG Peat Marwick	40.2	21.8	14.3	9.6	14.1
3	Arthur Anderson	18.9	15.7	58.2	7.2	-
4	Ernst & Young	43.2	28.3	18.1	10.4	-
5	Price Waterhouse	41.3	27.9	21.7	9.1	-
6	Touche Ross	39.4	24	20.3	11.5	4.8
7	Grant Thornton	34.8	29	-	23.6	12.6
8	BDO Binder Hamlyn	60	29	4	7	-
9	Pannell Kerr Forster	46.4	24	6.1	15.7	7.8
10	Stoy Hayward	47.8	20.7	11.4	20.1	-

Source: Accountancy, July 1994

According to the report, Arthur Anderson has maintained its spectacular growth record to surge ahead of Ernst & Young and claim third place in the league table of the top 10 UK firms.(36) Coopers & Lybrand retaining its status as the largest firm in the UK whereas Arthur Anderson took over as number one in the USA and in the world as shown in the following table.:

Table 1.21: Top Ten Accounting Firms in the World - Member Firm Fee Income ($million)

Ranking		Firm	Fee Income
1993	1992		
1	3	AA & Co, SC	6,017[1]
2	1	KPMG	6,000
3	2	E&Y	5,839
4	4	C&L	5,220
5	5	DTTL	5,000
6	6	PW	3,887
7	7	BDO	1,150[2]
8	8	GTI	1,080
9	9	MRI	732
10	10	RSM	688

[1]Total includes both Arthur Anderson and Anderson Consulting, separate member firms of Arthur Anderson & Co., SC, [2]Estimated by firm

Source: International Accounting Bulletin

After dominating the league tables since its 1987 merger KPMG shared top billing in 1993 with Arthur Anderson & Co with both firms reporting Global fee income of $6 billion.(37) Similarly Anderson consulting ranked number 1 among the top consultancies in the world as shown in the following table.

Table 1.22: Top Ten Consultancies in the World Ranked by Revenue

Firm	1993 Revenue ($/million)	1992 Revenue ($/million)	Growth rate (%)	Effective date	Number of consultants	Total Staff	1993 revenue per consultant
Anderson Consulting	2,880.0	2,720.0	5.9	Dec '93	24,598	29,296	117,083
McKlnsey & Co	1,300.0	1,150.0	13.0	Dec '93	3,000	5,700	433,333
Ernst & Young	1,040.0	867.0	20.0	Sep '93	7,137	8,750	145,719
Coopers & Lybrand	894.0	952.0	-6.1	Sep '93	6,400	N/A	139,688
Deloitte Touche Tohmateu Int'l	880.0	808.0	9.2	Aug '93	6,365	8,795	138,256
Mercer Consulting Group	855.0	908.0	-5.8	Dec '93	N/A	7,788	N/A
Booz-Allen & Hamilton	804.0	711.0	13.1	Mar '94	4,592	5,471	175,087
KPMG	746.0	758.1	-1.6	Sep '93	5,805	6,903	128,510
Price Waterhouse	723.0	736.0	-1.8	Jun '93	6,639	N/A	108,902
Towere Parrin	709.0	684.6	8.6	Dec '93	N/A	4,730	N/A

Source: Management Consultant International, July 1994

Although most of the big accounting firms still obtain about half of their fees from auditing, they are increasingly becoming financial advisory and professional services' companies. Similarly all of the accounting firms in the Middle East are offering management consultancy and corporate advisory services to their clients. The most notable transnational audit firms operating in the region are given in the table below.

Table 1.23: The largest accounting firms in the Gulf region

	UAE	Bahrain	Saudi Arabia	Oman	Qatar	Kuwait
Arthur Andersen	X	X	X	X	X	X
Coopers & Lybrand	X	X	X	X	X	X
Peat Marwick (KPMG)	X	X	X	X	X	X
Ernst & Young	X	X	X	X	X	X
Price Waterhouse	X	X	X	X	X	X
Deloitte Haskins & Sells	X	X	X	X	X	X
Touche Ross	X	X	X	X	X	X
Grant Thornton	X	X	X	X	X	X
Spicer & Pegler	X	X	X	X	X	X

Source: UNCTC, based on various sources including own enquiries

Accounting and auditing dominated by six companies originating in the United States and the UK, constitutes a prominent example of Western influence in the Gulf region. The industry's international operations are organised as more or less loose collections of largely autonomous partnerships; reflecting this organisational form. The transmittal accounting TNCs created in this manner include national firms operating under their own names or those of their parent companies. The national firms which are very small and very few are owned and managed by citizens of the country in which they are located in some cases and by professional expatriates from other parts of the Middle East and Asia.

In recent years we have seen collaboration and other arrangements made by local firms including the representation of an international organisation in certain markets and the short term secondment of personnel from other firms for specific assignments in countries in which a firm has no permanent base (38). The table below lists the most recognised Pan Arab accounting firms operating in the region.

Table 1.24: The largest Pan Arab accounting firms operating in the Gulf region

	UAE	Bahrain	Saudi Arabia	Oman	Qatar	Kuwait
Saba & Co.	X	X	X	X	X	X
Talal Abu-Ghazaleh	X	X	X	X	X	X

These firms are limited in global resources and technical support when compared with transnational firms. Recent press releases by Talal Abu-Ghazaleh accounting and consulting firm seems to indicate that small firms intend to tackle the problem of technical support by making arrangements with the Chartered Institute of Certified Accountants in the UK and making association with other medium size accounting firms.

1.1.4 Industrial and commercial opportunities in government and private sectors

1.1.4.1 Introduction

The Middle East is coming of age as far as using computers is concerned. This increasingly requires solutions which are tailored to the needs of Arabic speaking professionals in government offices and the private sector.

According to Sir Richard Beaumont (39) the computer has over the past ten to fifteen years, opened up a vast new market for the sale of expertise and technology, hardware and software worldwide. In the Arab world, the development of computer technology has coincided with a period of rapid infrastructural, social and industrial growth. The application of computer processes to a wide range of business activities has led to sustained demand in areas such as the oil industry, banking and finance, retail trade, government and defence industry, to name perhaps these areas are according to Sir Richard have been areas in which great strides have been made in the Arab states, at a time when the desire to introduce the most modern technology available has been a common ambition of the more wealthy oil producing states in the region, particularly the countries of the GCC. At the same time Sir Richard points out that the manpower strategies with which these countries have had to content with, especially in the field of skilled and semi-skilled workers, has made the potential introduction of labour-saving computer applications a particularly attractive proposition.

1.1.4.2 Gulf Expatriate Work Force

The shortage of local skilled workers in the GCC States is further amplified in an article published in the Arab British Commerce (40). According to the article the huge development programmes carried out in the Arab Gulf states and Libya in the 1970s and early 1980s have led to unprecedented growth in the expatriate workforce there. As their native population and labour forces are too small to cope with such programmes, they attracted large numbers of skilled and unskilled workers from other Arab countries, Asia, and beyond. According to the United Nations estimates, non nationals living in the six Gulf Co-operation Council (GCC) states in 1986 numbered approximately 6.4 million or about two fifths of their combined population of just under 16 million that year. Although current figures for the 1994 work force are not available, the percentage in the view of the researcher may not have changed dramatically.

Table 1.25: Percentage of Gulf Expatriate Work Forces 1991 (latest available figures)

	Work Force	
	Local	Expatriate
	%	%
United Arab Emirates	9	91
Bahrain	44	56
Saudi Arabia	52	48
Oman	36	64
Qatar	10	90
Kuwait	58	42

Source: Gulf Organisation for Industrial Consulting-Gulf Statistical Profile 1993.

In the researcher's view dependency on expatriate skilled workforce could prove to be less desirable because of their lack of commitment to the countries in the region, particularly in the computer and information technology sector where professionals are very mobile. Recent events in the Gulf and the impact of the Iraqi invasion of Kuwait is a living proof that dependency on expatriate skilled workforce has its drawbacks. It should be noted that the GCC States realise that heavy reliance on expatriate workers, which is often expensive, is likely to continue for many years, they have allotted large shares of their development spending to education and vocational training to boost their domestic labour sources. Greater emphasis has been placed there on women's education and in some of their universities there are now more women than men. *Saudi-isation, Kuwaitisation, Bahrainisation and so on have now become catchwords as all Arab* Gulf states plan to cut their expatriate workforce, partly as the result of development of indigenous labour resources and partly because of the slower economic growth that has followed the boom of 1970s and early 1980s and the huge drop in their oil revenues in the late 1980's (41). According to the MEED market survey it was stated that the GCC markets are also greatly determined by the extremely high proportion of non-nationals present in the population. While few countries publish figures on the size of this group, recent estimates by the UK-based analysts, Birks and Sinclair Ltd., for Saudi Arabia-the largest GCC market- show that it amounted to more than 4.4 million by mid-1990. (Table 1.26) Immigrants and workers from the Arab states formed the largest group, amounting to total population of 1.7 million, or 39.4 per cent of the total non-national population. Within this group, Egyptians numbered more than half a million, followed closely by 471,000 Yemenies, 311,000 Palestinians and Jordanians, 194,000 Sudanese and 128,000 Lebanese.

However, after the Iraqi invasion of Kuwait, the numbers of Palestinians, Jordanians and Yemenis fell considerably due to the rising political tension and changed Saudi policies regarding their visas and sponsorship arrangements.

Table 1.26: Saudi Arabia: non-national population by nationality, 1990

Nationality	Number	% of total
Egyptian	526,310	11.9
Sudanese	193,510	4.4
Jordanians and Palestinians	310,720	7.0
Lebanese	127,600	2.9
Syrian	34,050	0.8
North Yemeni	373,890	8.4
South Yemeni	97,141	2.2
Other Arab	83,610	1.9
Arab Sub-total	1,746,831	39.4
Pakistani	408,130	9.2
Bangladeshi	283,250	6.4
Indian	592,470	13.4
Sri Lankan	289,310	6.5
South Asian Sub-total	1,573,160	35.5
Filipino	356,560	8.0
South Korean	113,910	2.6
Thai	31,900	0.7
Indonesian	153,370	3.5
Other Asian	66,910	1.5
East Asian Sub-total	722,650	16.3
African	143,718	3.2
Europe, N. America	115,458	2.6
Other	135,349	3.1
Sub-total	394,526	8.9
Total	4,437,167	100.0

Just behind the Arab population, expatriates and migrant workers from the Indian Sub-continent-Pakistan, India, Bangladesh and Sri Lanka, formed 35.5 per cent of the total non-national population, amounting to almost 1.6 million in all. In the 1990s, this percentage could rise as Indians, Pakistanis and Bangladeshis, along with Egyptians and Syrians, are hired to replace Palestinians, Jordanians and Yemenis.

Indians formed the largest community in mid-1990, numbering more than 592,000, followed by 408,000 Pakistanis. Other substantial expatriate communities in the kingdom included Filipinos, who number an estimated 357,000. Finally, while the number of expatriates from Europe and North America was relatively low, amounting to only 115,000, or about 2.6 per cent of the non-national population, their spending power outstripped that of most other nationalities given their dominance in high-level managerial, executive and technical positions.

While the size of the non-national population is projected to rise during the 1990s, the percentage they represent in the population as a whole could fall from about 42 per cent in 1986 to only 36.4 per cent by the year 2,000. This reflects the fact that many Gulf states, including Kuwait, are planning to implement policies that are aimed at achieving a more balanced population distribution between nationals and non-nationals. The nationality and mix of skills within the expatriate population will be different in the 1990s than in the 1980s as well. Large numbers of unskilled and semi-skilled construction workers will probably leave the region and there will be fewer opportunities for expatriates in the local civil service sectors since these are precisely the jobs favoured by the indigenous population. Nevertheless, as the Arab-British Chamber of Commerce in London points out in a recent study, the Gulf countries, including Kuwait, will continue to depend on expatriates to perform certain technical managerial functions where the experience and the expertise required can only be achieved over decades. Moreover, there are many types of manual jobs that nationals in the Gulf states prefer to avoid, either because of inbuilt cultural bias or because the existing pay levels for these jobs are too low. As a result, the demand for unskilled workers performing as housemaids, construction workers, street clearness, etc. will remain (42).

1.1.4.3 The scope for computerisation

According to Zeid Nasser, Editor at the Star Jordanian weekly, the Middle Eastern information technology (IT) market is becoming very much like a big pie. Everyone wants a piece of it. All sorts of new developments are taking place, international companies are making their presence felt and the market is seeing some phenomenal activity.

Like the rest of the world, the Middle East has been profoundly affected by the massive growth in the personal computer business. The results of which have change the lives, economies and working habits of everyone in the region. Still, the Middle East differs from other regions in many ways. The nature of our market, our problems, market trends and the way we address our issues makes it a whole different ball game than, say, the rest of Asia he said.

According to Zeid, the lack of market data on the Middle Eastern computer market is a major drawback. There actually isn't a source for detailed data on the IT market in the countries of the Middle East. That is why *BYTE Magazine Middle East,* set out to create its own research unit.

In their quest for material, BYTE have discovered other 'missing services' in the Middle East, like a comprehensive database for computer users and clients in the region. *BYTE* had a need for such a service.

The statistics for the IT market in the Middle East, which BYTE did manage to obtain amounted to roughly $ 1billion in 1993. It is predicted according to him that the Middle eastern market will grow at a rate of 10-15% annually. This increase is not expected to level off for another 10 years! (Source" *BYTE Middle East* Research Unit).

With a projection like that, it's no wonder the region is being targeted by just about every major hardware and software company in the world. It also serves to explain the boom the region been seeing since 1991.

Let's take Arabization as an example. Software Arabization has proven to be a gold mine for software and hardware producers, and an indispensable development for the rest of the people in the Middle East.

Nothing, in his opinion, has accelerated the pace of Arabization like the release of Microsoft Arabic Windows. It triggered the flood of Arabic Windows applications seen on the market today, liberating Arabic-speaking users from the doldrums of the DOS environment and giving them access to the user-friendliness of Windows, along with the rest of the civilized world. But, perhaps Microsoft's most important contribution has been the creation of a widely accepted base for Arabic software developers to build on.

In addition, Microsoft has always managed to be there first with Arabic Windows applications like Arabic Word, Arabic Excel, Arabic Visual Basic, and now, Arabic Access. Summing up this expanding line of products in a rather Middle Eastern way, Microsoft says that "The family is getting bigger".

Other major software publishers like Lotus and WordPerfect have been much slower to come to the market with their own Arabic Windows applications. Consequently, a typical PC on the desk of an Arabic-speaking might have up to three Microsoft Windows applications, in addition to the Microsoft Arabic Windows operating system itself. Nowadays, a number of OEMs (Original Equipment Manufacturers) in Saudi Arabia have made it standard procedure to load Microsoft Windows directly onto the system. If you're not a big Microsoft fan, there's practically nowhere to run-especially given the prohibitively high cost of purchasing software.

While big software publishers say they are fearful of plunging into a market plagued by piracy, there seems to be a steady stream of companies making their way to the Middle East anyway. Despite the perilous pitfalls of piracy, our regional market is lucrative enough to attract international attention.

Hardware companies are interested in the region too. Compaq Computers, for example, recently opened a new branch in Bahrain specifically to cater to its resellers and customers in the region. Other American manufacturers, such as AST, Sun and IBM are already a part of the regional corporate landscape. Even the computer "big boys" of South East Asia are Starting to make their way to the Middle East. Taiwanese giant, Acer, has opened a manufacturing facility in Dubai's Jebel Ali Free Zone.

As far as profit is concerned, these companies must have a pretty good idea about the potential of this market. The Middle East is obviously ripe for further IT expansion.(43)

1.1.4.4 Size of the Market

According to a market survey carried out in 1994 by Tony Morbin, editor of computer news Middle East. It was stated that "In just over five years, the Middle East's computer industry has matured from a 'get rich quick' bandwagon full of pirates and cowboys to one of the world's pre-eminent growth markets for leading edge IT. Now it's taken seriously by the major multinationals, with a rapidly developing market of tailor-made Arabised products developed to meet local needs.

During 1993 regional imports of all computer hardware (excluding parts and accessories) from the leading manufacturing countries were forecast to have exceeded US $1,000 million - up from a record $900 million in 1992, itself a significant increase on 1991's figure of $825 million. And the rate of growth according to the Alain Charles Research Unit.is forecast to speed up in 1994, to reach $1,150 million (it should be noted that actual figures for 1994 were not available).

Figures for software sales are less quantifiable as they include not only the perennial variable of piracy, but also the difficulty of disentangling the growing expenditure on training and support services.

However, results of a Computer News Middle East readers' survey in 1993 showed combined hardware, software and training expenditure by its readers of more than $1,388 billion per year. It would therefore be reasonable to estimate that the entire Middle East IT market now exceeds $2 billion per year.

Money is undoubtably being made by the Middle East computer industry - with AST quadrupling computer sales in the region over the past two years, according to president Safi Qureshey. and many other niche players are also making more than ever before. But for many of the major players, the primary objective at the moment is to increase market share.

It is unit sales that are increasing by 30 per cent and more a year - not profits. The big boys are jostling for installed user base, with IBM trying to hang on to as much of its market dominance as it can, including embracing the client server environment. And in the software area there is Microsoft's vast marketing effort endeavouring to sweep away all opposition.

In many areas industry standards do not exist. And it is the battle to become an industry standard which dictates the marketing initiatives in today's Middle East computer market. It remains to be seen what blend of technological excellence, marketing clout, financial staying power or patriotic preference wins out -though all these factors are sure to play a part. For all our readers' sakes we would hope that meeting user requirements heads the list.

In the jostle for market share, many of the multinationals are Arabising their products, with Microsoft pledged to make all its core products fully bilingual in Arabic - with nine Arabic language programs already published, and WordPerfect developing an Arabic version of its word processing package. In addition, Oracle in Dubai has full time developers working on Arabic database solutions. And the delay between introduction of new English language software from the major development houses and the launch of Arabised versions - or original Arabic versions - continues to decrease. Whilst there is also a corresponding increase in the production of indigenous Arabic developed software from companies such as Al Alamiah, SaudiSoft and 01 systems in the PC market and Datamas in the systems market.

Prior to the widespread development of Arabic or Arabised programs, transparent Arabisation shell operating programs led the field for local computer users with programs such as the Bahrain's 01 Systems' Nafitha, Al Alamiah of Egypt's Sakhr, and Microsoft's ADOS.

But as countries such as Kingdom of Saudi Arabia (KSA), Egypt, the UAE and Jordan pass anti-piracy laws, so they provide the incentive for international companies to Arabise more of their products and for local developers to produce original Arabic software for PCs as well as Macs. The clampdown on software piracy, and the corresponding improvement in the prospects for Arabic software developers will inevitably widen the base of local talent utilising its skills - and being rewarded for doing so.

Now Apple, which produced an Arabic version of its operating system back in 1988, has released an Arabic version 7.1 which will allow all Macintosh users to add Arabic to their operating system.

Arabic spellcheckers and grammar checkers are also now being bundled with the latest packages, along with specially developed calligraphy packages. Interestingly, the term 'Arabisation' is steadily taking on the broader meaning of empathy with Islamic and Arabic traditions and culture.

With copyright laws coming into effect, the vast 'grey' market should start to wither, not so much at the individual level, but among corporates, governmental organisations and departments, as major players such as Microsoft institute court actions. Given the face-to-face nature of the market, it is likely that most potential offences will result in quiet compromises before recourse to the law. But it is the threat of legal action which will bring this into effect and, without a few convictions, there will be no credible threat. So 1994 could see the first software piracy convictions in the Gulf.

A sharp-and expensive - learning curve experienced by computer users and purchasers over recent years has resulted in a sophisticated and informed client base demanding high performance, reliability and local support from its hardware vendors. That's in addition to original, appropriate and open software, plus competent, efficient after sales services including training.

All this is good news for the Gulf buyer and user, won at the expense of the manufacturers and suppliers who have seen hardware margins squeezed further each month, as software prices move closer to US prices. Rapidly advancing technology has resulted in that seemingly impossible advertising line-new, improved, higher performance at a lower cost than ever before.

As the market gets its act together, quality is now taken seriously enough for users to pay a premium - at the same time as the international giants have brought down their prices to compete with the clones. This increased quality demand on the part of Gulf buyers, and reduced prices by the industry leaders, makes the middle East an increasingly attractive market - particularly in the face of recession and lower profit margins elsewhere.

The inevitable result is that the region has seen a vast influx of IT expertise from around the world. In some cases, this has involved major investments in regional offices, or the appointment of local agents and distributor networks. Microsoft, Lotus, Brother, AST and Oracle have been joined by Digital, 3 M Gulf, 3 Com, Cabletron, and SynOptics, among others, with new offices in the Gulf; and new distributorship/agent arrangements have been made by Silicon Graphics, Sun, Gupta, and Fujitsu, whilst Microsoft's Saudi distributor ISCO has established itself and Jebel Ali distribution centres have been opened by AST, Philips, Graybar International Middle East, as well as a regional network set up by Informix.

In fact the region has even dipped its toes into hardware manufacture. Several hardware suppliers in Iran have overcome technology export bans, the Omani PC - Kanz - is now being manufactured in the Sultanate, while Sedco in Jordan Arabises terminals as well as developing its own products.

The hardware tie-in, however, is being replaced by the 'familiarity' and 'expertise' tie-in. As companies such as lotus and Microsoft either appoint or establish local training centres, so their 'graduates' can be expected to have a natural affinity for the products which they know. Just as the mainframe-biased MIS manager steers his organisation away from downsizing, so the trained computer user steers his company towards particular software vendors.

Another route to capture the consumer has been through the education market, with Al Alamiah successfully beating Microsoft to supply the Saudi Ministry of Education with Sakhr Arabic Windows, to be used by 150,000 secondary students. The advantage of this approach for Al Alamiah is that its pupils are the indigenous population who will be the decision makers of the future, whereas many of those attending training courses are expatriates who will take their skills and preferences with them when they return to their home countries.

Conversely, economic availability through bundling of Microsoft's Windows by OEMs is already providing an extensive de facto installed base. And both of these factors excludes the question of which system best meets the actual requirements of users.

The move from mainframes to client servers has not been as noticeable in the Middle East as elsewhere in the world. Partly because private enterprise has been less encumbered with legacy systems, but also because centralised systems remain popular in many government departments. Kuwait's reconstruction has involved some major mainframe purchases by government departments.

But in the oil industry, usually at the forefront of technology, client servers are gaining ground. Silicon Graphics' MIPS-based machines are reported to have made significant inroads in Kuwait and Kingdom of Saudi Arabia (KSA), whilst Digital Equipment has also boosted its presence with 32 bit Alpha Risc chip machines and IBM has emphasised client server applications for its new machines in the AS 400 range.

More rapid than the moves toward downsizing, however, is the growth in computerisation of smaller businesses utilising the ever increasing power of the PC, including 32-bit processing and new operating systems such as Microsoft's NT. In addition to increased affordability the widespread availability of GUIs (Graphical User Interfaces) such as Microsoft's Windows-often installed on the machine when bought - and easier to use applications, have made the move to computerisation less daunting. However, many of these buyers have little or no knowledge of computers and are left confused by the conflicting high-tech sales approach of many vendors.

But they represent the real opportunity: a doubling of the current market. GUIs and availability of Arabic and bilingual application may have eased entry into the market, but the technological virgins highlight the need for training. And this is now a major growth area.

As users move from hierarchical systems to client server networks, networking systems and software have become a major growth market, reflected in the new offices opened in the region by SynOptics, Cabletron and 3 Com, new tie-ups between Novell and Farabi Technology, and Novell and SynOptics, as well as increasing networking requirements specified in government tenders.

Some newcomers to the region may still have overseas headquarters who view the Middle East as awash with money, willing to buy technology for technology's sake. But all the evidence suggests that today's highly qualified decision makers in the region have learn to be demanding, buying solutions appropriate to their needs, justified in terms of improved efficiency, quality and cost-benefit. Just as an affluent, informed, maturing market should be.(44)

1.1.4.5 Size of the Market in the UAE

The growth in sales of computer hardware in the UAE has been encouraging, despite relatively slow growth of the economy as a whole. In 1993, it is estimated that the gross domestic product of the UAE increased by only 1 per cent in volume terms, as production of oil in the Emirates has been slowing down. Oil exports are believed to have fallen by 10 per cent in 1993, and were compounded by low prices, though a significant revival in sales of oil products and prices has been seen during 1994.

It is estimated that the economy for the UAE has grown by 2.2 per cent in volume terms this year 1994, with the pick-up activity in the oil sector. Some sectors have shown a revival in trading, especially in the construction field, and the improved economic environment has provided a boost for sales in the computer industry.

According to CNME economics correspondent John Steel that 1994 the UAE's total computer hardware imports, including peripheral equipment, parts and accessories, is forecast to reach $165 million - up from approximately $140 million during 1993. And this growth is forecast to be maintained in 1995 when it could reach more than $190 million. The 1993 totals were themselves an increase on the 1992 figure of about $120 million.

Imports of computer products into the UAE inevitably include products which are then re-exported to other parts of the Middle East. Nonetheless, a high proportion remains within the UAE, and overall imports have been growing appreciably over the past few years. In particular, demand for processing units has been higher, and there have also been substantial increases in imports of storage devices.

Sales from the United States rose dramatically, to nearly $40 million in 1993, double the figure for 1992. Deliveries by some of the European suppliers have also risen substantially, especially from France whose sales went up fivefold to $26 million in 1993, while those by the UK grew by 30 per cent to nearly $80 million in this period. In addition, increasing deliveries have been reported by Germany, whose sales rose by 14 per cent to $5.7 million, while those by Holland were $13.5 million. However, Asian sales have been uncertain, and deliveries by Japan in particular were lower, dropping from $11.5 million to $10.6 million.

Imports of computer systems have been rising steadily and accounted for $16.5 million in 1993 as against $15 million in 1992. Sales by the US advanced markedly to nearly $7 million as against $4 million in 1992. In addition, deliveries of systems by France jumped to $3 million, while those by the UK rose gradually to over $3 million in 1993, as against $2.5 million in 1992.

Imports of processing units have grown rapidly to $58 million in 1993, up from $31 million in 1992. Sales of processing units by the United States doubled to $21 million, while those by France jumped to $19 million in 1993 having been less than $2 million in the previous year. Steady rises have also been reported for exports of processing units to the UAE by Holland whose deliveries reached over $10 million, while those by the UK were steady at $1.3 million.

UAE imports of input/output units such as printers and video screens fell from $30 million to $23 million, though American sales of peripheral units reached $5.7 million, up from $3.5 million. Some European suppliers have also stepped up their deliveries in this UAE imports of IT hardware - arising trend sector, including Germany and Holland, while France advanced to $1.6 million as against $ 1 million in 1992. However, Asian sales of input/output units have been uneven and Japanese deliveries dropped from $7.6 million to $6.3 million in this period.

Early this year (1994) the UAE saw increasing imports of computer products, with sales by Japan reaching $6.8 million in the first five months of 1994, up from $4.8 million in 1993. Exports of dot-matrix printers rose to $3.8 million as against $2.2 million in 1993, while rising deliveries have also been reported for processing units. Their value more than doubled with Japanese deliveries accounting for $2 million in this period.

US deliveries of computer products have been slightly lower this year, dropping to $13.8 million in the first five months of 1994 as against $14.8 million in 1993. A slight fall has been seen for processing units, with their total dropping from $7.4 million to $7 million in the first five months, but US sales of peripheral equipment have been maintained, reaching $600,000, up from $500,000 in the same five month period in 1993.

European Union sales of computer products to the UAE have been more than maintained; in particular, deliveries by the UK rose to $7.5 million in the first quarter of 1994, up from $4 million in 1993. And exports of input/output units by the UK to the UAE jumped to nearly $2 million, having been less than $400,000 twelve months earlier, while for processing units they trebled to over $700,000 in this period. In addition, increasing British deliveries of computer parts have been reported, with their total reaching $2.4 million in the first quarter of 1994 as against $1 million in 1993.

The interim figures for the early part of 1994 confirm the continued strength of the UAE computer sector, where foreign IT deliveries have increased by at least 15 per cent in 1994 as a whole - and this growth is forecast to continue and possibly even speed up during 1995.(45)

According to Colin Corder (46) a considerable number of firms have set up software companies in the Gulf. The purpose of these companies is to cater to the local market in the following major application areas:

(a) Banking

(b) Construction

(c) Travel

(d) The Oil Sector

(e) Education

(f) Government.

1.1.4.6 Banking

Banks are one of the most obvious and earliest users of computing. Many Arab banks are already in their second generation of computer systems and are changing, or have changed old unit record systems for modern real-time banking capability. Typical of these is the National Bank of Dubai, which has recently made the change to real-time accounting system based on a package running on NCR equipment and previously installed in other banks within the area. The homogeneity of banking systems makes it a fertile area for packaged software, and the UK companies Hoskyns and BIS, with their banking package KAPITI and MIDAS respectively have several clients in the Gulf.

In the current economic climate, banks are moving to attract a larger number of high net worth depositors, whilst at the same time improving the range and quality of customer services, including most notably cash dispensers, otherwise known as Automatic Teller Machines (ATMs). NCR are dominant in this area. Because such machines interface directly with the general public they are of necessity dual language. American Express has 70,000 card holders in the region and is currently introducing bilingual cards. In the future there will be scope for the introduction of Electronic Funds Transfer through such international networks as Chemical Banking Corporation GEONET, as well as for funds transfer at point-of-sale and home banking.

1.1.4.7 Construction

The construction sector has borne the brunt of the downturn in the economies of the region. Nevertheless the availability of inexpensive and powerful micros such as the IBM PC and the Hewlett Packard means that there is still scope for specialised computer applications using software to cope, for example with areas such as land drainage, heat gain and loss, and computer aided design. Most of these packages require specialist support. For example, the Saudi-Bahrain causeway, costing $2.5 million a week to build, has used four Hewlett Packard minis to control all work in progress, inventory and costing.

1.1.4.8 Travel

Although Gulf Air, Saudia, and the Dubai National Travel Agency (DNATA) have sophisticated real-time systems, scope exists for enhancements to such installations. DNATA claims that its (D-MARS) system is "the Arab world's only multi-access reservation system". It also incorporates hotel and car reservations, whilst their LOPAC system controls checking and load control.

In common with other competitive service-oriented industries as banking, the level of customer service in the travel industry is highly influential in market share Information technology is playing an increasing part in improving the competitiveness of individual companies through the more rapid provision of information.

1.1.4.9 *The Oil Sector*

During the 1970s and the early 1980s, the oil industry was the engine of growth in computing throughout the region. Vast hardware acquisitions were made and complex systems designed and installed which relied largely on a substantial pool of expatriate labour. The nationality of such expatriates and the country of origin of the computer systems in use was largely determined by political spheres of influence. Both ARAMCO and ADNOC in recent years have purchased large Cray computers, costing millions of dollars, for use in simulation and exploration. Within their commercial processing there has been a move towards decentralisation through the spread of personal computing. Because of their key positions within the economies of the countries concerned, such companies are now in the vanguard of the move towards computer Arabisation.

1.1.4.10 Education

There has been no official introduction of computers into state schools within the region, although some private schools have introduced them. However, many companies are currently engaged in pilot schemes and trials. Saudi Arabia anticipates that all secondary schools will have computers by 1995. Kuwait, Oman and the UAE are running pilot schemes, and Qatar has set up a teacher training and software development centre.

1.1.4.11 Government

The public sector has always been a major user of data processing equipment in countries worldwide and the GCC states are no exception. Almost all major ministries have installed computers although not all are using them to their full potential. This highlights one of the major trends and therefore one the opportunities for growth, which is that of software. Ministries of health, social insurance, immigration, education and others with large record keeping functions are in the process of computerising large data systems. Of equal significance are the Armed forces, where major systems are under development and where systems expertise is still required.

1.2 Purpose, need and limitations of the study

1.2.1 Purpose

The purpose of this study is to examine closely the impact of information technology on accounting and auditing in the Middle East with special emphasis on arabisation, transfer of technology and training.

The objective of the study is to deal with two distinct problems relating to computer technology. The first is that of availability of such technology in the Middle East. The second concerns the effectiveness and level of its introduction to accommodate the specific requirements of the region.

The specific objectives of this research are as follows:

(a) to review the current status of computer technology in the Middle East;

(b) to outline the inadequacies of the current practice by businesses, governments, auditing firms and educational institutions; and

(c) to discuss the implications of such technology on the region as a whole and its impact on issues as Arabisation, transfer of technology and training.

To the accomplishment of most of the desired objectives of the study, a research methodology was developed which included a historical analysis and literature search, development of hypotheses and pilot study analysis of the survey, interviewing through a research interview questionnaire and analysis of data collected in a descriptive and statistical manner.

Of the computer technology users, providers and consultants, the study focused on the key variables namely introducing the technology, computer hardware, computer software and training.

1.2.2 The Need For the Study

The use of computers and information technology is altering the way we do things. Middle East practitioners at present are experiencing a transition in contemplating the use of technology to improve their working methods.

The traditional role of Arab accountants is changing. There is a great deal of demand for improved skills to cope with the increased use of technology by government agencies, private businesses and educational institutions.

The improved economic conditions in the Middle East over the past decade have made it possible to acquire new technology, and at the same time made it necessary for accountants and auditors who do not have technical skills to upgrade their standards to deal with the revolution of information technology that is taking place in the West.

1.2.3 Limitations

It is acknowledged by the researcher that the impact of computer technology cannot be assessed accurately in the Gulf States without the proper and available statistics and information. It is anticipated that most of the respondents to the research questionnaire would be expatriates working in the Gulf which in the view of the researcher may have certain element of biases.

It is also acknowledged by the researcher that other limitations may involve the quality of responses to the questionnaire and the level of expertise and knowledge and interpretations of respondents of the areas covered in the research.

REFERENCES

1 El-Naggar, S., "Adjustment Policies and Development Strategies in the Arab World" papers presented at a seminar held in Abu Dhabi, United Arab Emirates, February 16 - 18 1987 (Washington, International Monetary Fund) pp 1 - 2, 26 - 27.

2 Amuzegar, J., Oil Exporters Economic Development in an interdependent world, occasional paper no. 18 (Washington, International Monetary Fund, April 1987).

3 International Bureau of Fiscal Documentation "Joint Economic Agreement of the Members of the Gulf Co-operating Council" March, 1983 pp 1 - 10.

4 Ernst & Young "Doing Business in Saudi Arabia" E&Y, Saudi Arabia, 1994, pp 1 - 65.

5 Clifford Chance "Memorandum to Clinets and Professional Contacts of Clifford Chance" Clifford Chance, U.A.E., 1992, p 1.

6 Clifford Chance, Ibid.

7 Ernst & Young "Business Brief", E&Y, Middle East, Autumn, 1994

8 MEED, 8 July 1994 pp 29 - 36

9 IBID

10 Ernst & Young "Doing Business in the United Arab Emirates", E&Y, U.A.E., 1994, pp 1 - 37.

11 Clifford Chance, OP-CIT p 11.

12 MEED, IBID

13 Emirates Law, Abu Dhabi, UAE, September 1994, pp 3

14 Gulf News, Abu Dhabi, UAE November 7, 1994

15 Ernst & Young "Doing Business in Qatar" E&Y, Qatar, 1993, pp A1-G6.

16 MEED, IBID

17 IBID

18 Ernst & Young "Doing Business in Bahrain" E&Y, Bahrain, 1993 pp 1-41.

19 Gulf News, IBID, September 27, 1994

20 Arab League - Special Committee Study on the conditions of population in the Arab world with emphasis on economic, demographic, health and education pp 1 - 12

21 OAPEC - OAPEC Secretary's Annual Report No. 16 (1989).

REFERENCES

22 International Monetary Fund - International Financial Statistics Year Book 1989, for 1978 - 87 figures and international financial statistics, October 1989 for 1988 figures for Saudi Arabia and Kuwait.

23 Province of British Columbia - The Report of the Provincial Advisory Committee on Computers to the Ministry of Education, July 1987 pp 1 - 2.

24 League of Arab States "Strategies and Policies for Information" Regional Conference for information authorities in the Arab world, Tunis 5 and 6 November 1984. Preliminary and final recommendations p 1.

25 League of Arab States, Ibid.

26 Bird J., the Sunday Times, "Computing" column P C-6, 31 December 1989.

27 Staff writer, Gulf News, Gulf News Supplement on computers and Today's Office", 30 May, 1989 p 1.

28 Arthur, R., "Khaleej Times" Khaleej Times Supplement Coverage of The 7th Gulf Computer Exhibition", 12 October 1987.

29 United Nations Centre on Transnational Corporations "Foreign Direct Investment and Transnational Corporations in Services" UN New York 1989 p 107.

30 United Nations, Op.Cit, p 112.

31 Heyel, I., "The Encyclopaedia of Management" 3rd edition 1982 p 257.

32 APT, London, UK September 1994 pp 3 - 5

33 Arabian Computer News, volume 9, no. 10, October 1994, pp 2 - 3

34 International Accounting Bulletin, December 22, 1993, pp 10

35 IBID, September 1994, pp 5

36 Accountancy, Juy 1994 pp 14 - 15

37 International Accounting Bulletin, IBID, 1993, pp 6

38 UNCTC, Foreign Direct Investment and Transnational Corporations in Services, (United Nations Publication, Sales No. E.89.11.A1)

39 Sir Beaumont, R., Chairman, Arab-British Chamber of Commerce "Computerisation in Arab States - Extracts from proceeding of an Arab British Chamber of Commerce meeting on computerisation in Arab States in January 1986. pp 5 - 6.

40 Arab British Commerce "Manpower and Education" - Arab British Chamber of Commerce, year 12, No. 4, October 1989, pp 21 - 26.

REFERENCES

41 Arab British Commerce, IBID.

42 Smith. P.A "Gulf consumer markets - market size, structuree and prospects to 2000" MEED market survey 1991, pp 17 - 19.

43 Byte Middle East, October 1994 pp 91 - 92

44 Computer Guide Middle East "The Market Surveyed", 1994, pp 6 - 8

45 Computer news Middle East "IT sector remins buoyant in UAE" October 1994, PP 26.

46 Corder, C., "The Scope for Computer-Based Systems Products and Related Software in the Arab States of the Gulf "Chamber of Economic Report, Vol. Number 16, April 1986 pp 9 - 15.

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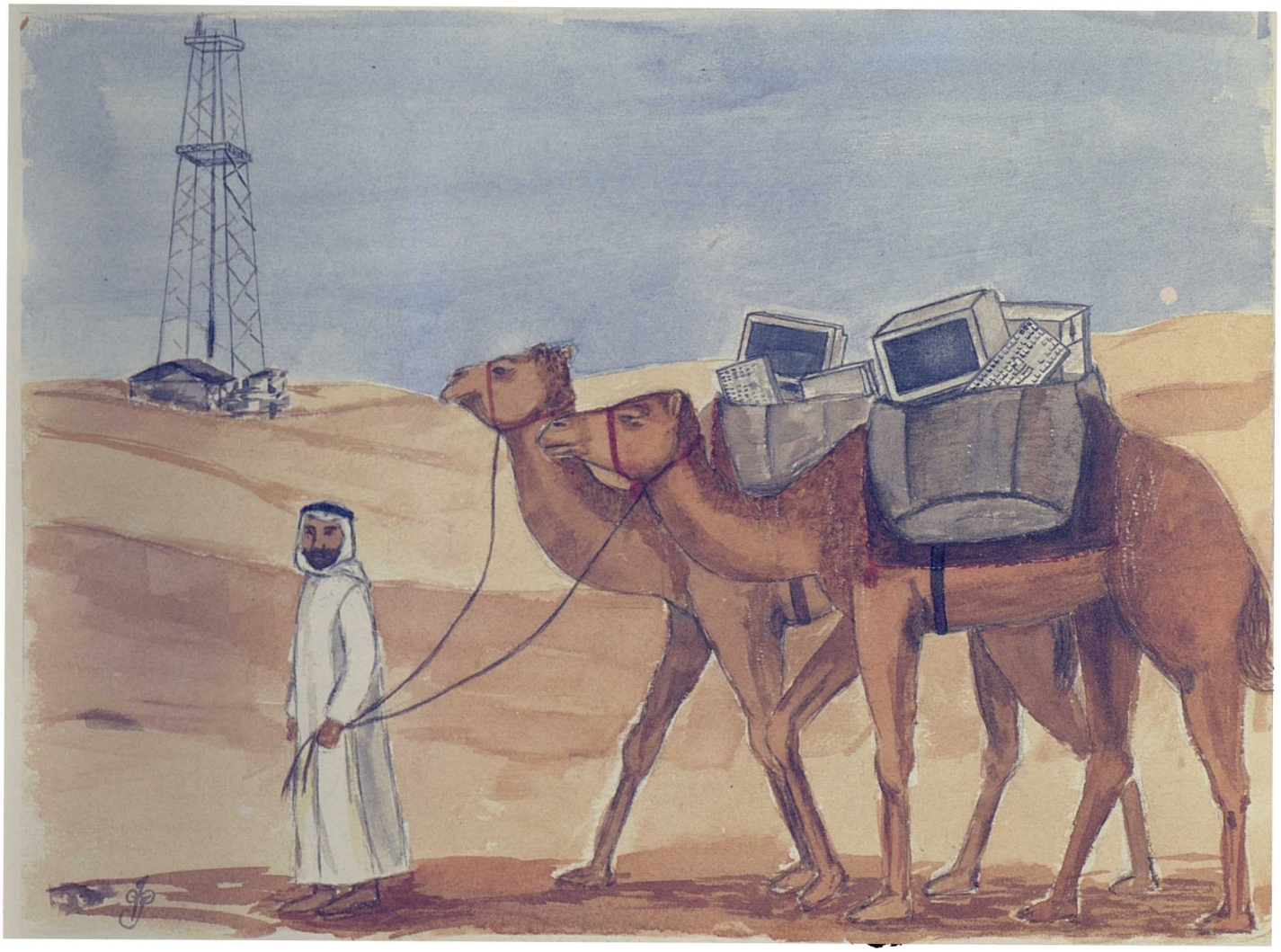
The Impact of Computer Technology on Accounting and Auditing in the Middle East with Special Emphasis on Arabisation, Transfer of Technology and Training



CHAPTER 2

HISTORICAL EVOLUTION OF COMPUTER TECHNOLOGY

CHAPTER II

HISTORICAL EVOLUTION OF COMPUTER TECHNOLOGY

2.1 Introduction

The purpose of this chapter is to trace the historical evolution of computer technology and its impact on the accounting and auditing process.

2.2 Historical perspective

2.2.1 Overview

The basis for electronic data processing techniques goes back to the abacus, which is an elementary arithmetic unit, and to the work of Pascal, 1642, Leibniz, 1694, and Babbage in 1833, all of whom attempted to build mechanical data manipulation units. Real progress, however, had to await the development of electronic techniques, since the mechanical devices were too slow, bulky, and unrealisable to be of general use. The transition from mechanical to electronic was realised in the Mark I computer completed in 1944, by Howard Aiken at Harvard University (supported by International Business Machines Corporation) and by the general development of Hollerith or tabulating device using punched cards. The first truly electronic system was the ENIAC, built at the Moore School of Pennsylvania and completed in 1946. This electronic computer was designed to perform the computation of ballistics tables for the US Army. Simultaneously, IBM developed an electronic calculator for general business use known as the IBM 604. Deliveries of this unit began in 1948. More than 4,000 of these were built and used for performing additions, multiplications, comparisons, and other processing related to a wide variety of business applications from payroll to statistical analysis.

The true flexibility of electronic data processing results from the concept of the "general purposes" computer, that is, a computer which stores its instructions in the same memory as it stores data, and can therefore manipulate its instructions as if they were data. This permits computer to perform a process repetitively on vast quantities of data by virtue of only a few procedural steps. It permits, in technical language, "address modification" and "program loops".

These facilities were first realised in the EDVAC, built by the Moore School between 1947 and 1950, the SEAC, built by the Bureau of Standards between 1948 and 1950, and Whirlwind I, built by Massachusetts Institute of Technology (under contract with the Office of Naval Research) between 1947 and 1951.

The first system designed specifically for business applications was Univac I, built by Presper Eckert and John Mauchly between 1947 and 1951. the UNIVAC I is a direct descendent of the ENIAC AND EDVAC on which Eckert and Mauchly had worked at the University of Pennsylvania.

The group which built the UNIVAC I was also among the first to develop "automatic programming" techniques, programs which assist in writing other programs. These early computers gave rise to the now bewildering variety of computers available.

The generation of computers

The designation "first generation" is given to computers that were installed roughly in the period 1955-1960. The were relatively large scale, used vacuum tube circuitry, and had the limitations of small, slow cores of the millisecond cycle type, limited registers and accumulators, heavy reliance on punched card input/ output, and slow and troublesome peripherals. the machines were cumbersome and highly sensitive to environment, requiring air conditioning. So called "machine language" was used, rather than the later, high level simplified, languages and there was little or no major software (ie. computer programs).

The second generation were the first solid state transistorised computers that began to come into installation between 1960 and 1965. They were more user oriented, and improved circuitry, and technology made them less sensitive to environment. The central processors had expanded, higher speed memories. Magnetic tape began to be used heavily, and peripherals were improved. Random-access storage devices came into use. Smaller computers and modular systems broadened the areas of applications.

The third generation computers were widely announced in 1964 and 1965 and began to come into installation in late 1965. Integrated circuitry made miniaturisation possible. Real time access and "time sharing" capabilities were features of many central processors, providing the capability of access from remote terminals.

The price of third generation computers, because of their increasing miniaturisation, had been steadily decreasing. It has been suggested that a "fourth generation" of computers has arrived with the advent of the microcomputers. Today, miniaturisation allows computers to configure a CPU on a silicon wafer that is smaller than a human thumbnail (1).

The fourth and fifth Generation after the third generation, developments in computer technology were occurring so rapidly that the popular term generation for reference to computer hardware development fell into disuse. However, the term was revived during the early 1980's to refer to advancements in computer languages (fourth generation) and to computers of the future (fifth generation). Fifth generation computers will simulate intelligent behaviour, including such capabilities as conversing, answering questions, and playing games. Although computer history is relatively short, its impact upon business and society has been great.(2)

The pace of change in information technology is very rapid, and probably no more so than in computers miniaturisation and software engineering and artificial intelligence.

2.2.2 Current Hardware Development

The main advances in computing machines in the last four decades have resulted from increasing miniaturisation and cheapness of computing elements and storage devices for data together with changes in general approaches to control computing management (3). See table 2.1 below:

Table 2.1 Generations of Modern Digital Computer

Generation	Approximate dates	Main features
1	1945-55	Based on theoremic valves, stored program machine, single processing unit, basis of generations 1 -3.
2	1955-64	Based on transistors (invented in 1948) use of machine-independent programming languages, delegation of input/out to subsidiary processing units, provision of systems software
3	1956-80?	Based on semiconductor integrated circuits, improved memory management techniques to handle very large programs, introduction of concurrent programming.
4	1980 - present day	Use of large scale integration, highly parallel processing units, supercomputers, sophisticated programming support tools, sophisticated personal workstations, artificial intelligence machines.
5	1990s?	Very large scale integration, preliminary conceptual designs appeared early 1980s. Main futures include "knowledge processing" capability and sophisticated machine interaction (eg. via speech).

"Computers are shrinking in size and exploding in performance" said, Jan Bird (4), of the Sunday Times. In the 1960s they were the size of rooms and had to be kept in air-conditioned environments. Today, they can be bought off the shelf and installed on any desktop.

Sir Clive Sinclair, one of Britain's most innovative computer designers says, "they will eventually be small enough to fit on your shoulder, like a parrot". Perhaps the most significant driving force behind the rapid growth in computer capabilities has been the advance in integrated circuit technology. The basic discovery in 1948 that miniature switches in the form of transistors could be fabricated from semiconductor material such as silicon or Germanium caused the first major revolution in computer hardware. The subsequent invention of the integrated circuit (chip) in 1959 comprising several logic gates built into one piece of semiconductor brought a further dramatic change in computer environment (5). Since then chip complexity and component miniaturisation have gone through several quantitative leaps as shown in the table below:

Table 2.2 Quantitative Leaps in Chip Complexity

		Components per chip
Small-scale integration	(SSI)	2-64
Medium scale integration	(MSI)	64-2000
Large scale integration	(LSI)	2000-64000
Very large scale integration	(VLSI)	64000-2000000
Ultra large scale integration	(ULSI)	2000000-64000000

(Source: Burger Et Al 1984 (6).

According to a recent article published in the Gulf News (7) major innovations are also taking shape with software and semiconductors. Japanese scientists in a dust-free "Clean Roo" are on a quest for a new class of semi-conductors thousands of times faster than the chips now in use. Much of the private work on the new chips is being done in Japan. Their new compounds are experimental form of "Quantum Chips" that someday may allow supercomputers to become small as laptop computers.

Japanese semiconductors makers already have developed experimental 64 megabyte memory chips the size of a thumbnail with as many as 140 million tiny transistors and capacitors linked together in circuits only 0.4 micron wide about four thousands the width of a human hair. Quantum chips according to the article had existed only in theory because no one could make something small enough to utilise the wave nature of electrons. But recent advances in semiconductors manufacturing have enabled work on quantum devices to proceed in Japan, the United States of America, Europe and the Soviet Union.

2.3 Historical Development of Software

2.3.1 Introduction

The main development in computer hardware and the evolution of the modern business computer helped contribute to the development of computer software. The main reasons for this growth according to Pannell Jacson, and Lucas (8) are:

(a) The development of suitable computing equipment and simplified methods of computer use;

(b) Falling costs of equipment suitable for a limited range of business functions;

(c) the growth in generalised programs which can within limits be adapted to meet the requirements of individual business use of these program packages and for each new user;

(d) the increasing cost of clerical labour.

In 1954 the first computer was installed for a business application; processing of payroll. By 1974, only 20 years later there were over 100,000 computers in the United States and a like number in the rest of the world. Payroll processing by computer, which was revolutionary idea in 1954, is now considered a rather routine application. Today, the frontiers in information processing are systems which also provide information resources in support of managerial and decisions-making functions. Such a system is commonly called a management information system (9). The following section of this chapter traces the history of software and its evolution.

2.3.2 Computer Operating Systems and Application Software

In today's literature increasing attention is given to how software engineering can assist in the development of computer software. The aim is to evolve a coherent and systematic approach to all phases of the software development life cycle. Effective software is essential to the success of computer based applications (10).

Software can be categorised under the following headings:

(a) programming languages;

(b) application software; and

(c) system software.

2.3.2.1 Programming Language

A high level language provides the programmer with statements or commands which are written in English or mathematical formats, thus providing very much easier programming, particularly in data processing applications. However, the computer can only execute machine code instructions and it is therefore necessary to provide a translation program which will convert the high level language statements to machine code. These translation programs are known as compilers or interpreters (11). The following table shows the historical evolution of these programs.

Table 2.3 Programming Languages

Language name	Brief description
Fortran	Considered as the first high level computer language. Fortran is an abbreviation of Formula Translation developed by John Bakus in 1957 for scientific and engineering applications.
COBOL	Common Business Oriented Language - mainly for business applications.
CPIM	Developed by Gary Kildail, CPIM stands for Control Program for Microcomputer. A commonly used program which organises the internal operation of the computer.
BASIC	Considered as the most popular programming language for beginners. Developed initially in the early 1960s for the microcomputers, but its mostly used for personal computers in 1974.
MS-DOS	Designed in 1981 as the operating system for the IBM PCs.

2.3.2.2 Application Software

Application programs are computer programs written for an individual program application such as payroll processing. They generally require system software in their execution (12).

Early applications software include word processing, which is considered as one of the key business applications, spread sheet software database software and accounting related applications. Applications software is characterised by short history and rapid growth (13).

2.3.2.3 System Software

System software or operating system refer to the program instructions which enable the computer to interact with external devices or peripherals and which controls the organisation of application programs and data (14).

2.4 Information Technology

2.4.1 Introduction

In the view of the researcher, the thrust of computer technology is to process data at a high speed and to make information readily available for decision making. Information technology is a term which has become extremely fashionable in the late few years. It has little relation to either information theory - concerned with the information contents of signals - or to information science concerned many with the management of libraries. Information technology according to Wilkinson & Winterflood (15), is an embracing term which is applied collectively to the modern techniques associated with advanced computing systems and data communications. Its origins lie in the microchip revolutions of the 1970s which caused the price of computers to plummet in the 1990s. This according to the author led to the realisation that renewed economic prosperity would not come only from building and selling the physical machines that process data. It would come primarily from imagining and creating the intellectual tools that could exploit these inanimate machines and give meaning to data.

2.4.2 Evolution of Standards

The development of intelligent knowledge-based systems such as artificial intelligence has made its mark in 1980s the bulk of computing systems in commercial use at the present time are data processing systems which simply store, manipulate and re-create records of information such as:

- accounting systems;
- inventory control;
- word processing; and
- data processing and information retrieval systems.

Such systems as they now stand are basically "unintelligent". They can only apply their algorithms in a straightforward and inflexible manner.

Artificial intelligence and expert systems according to Walsh (16) have limited practical application compared to other information technology areas. He defines artificial intelligence as a discipline mainly concerned with developing computer systems that can perform functions normally requiring human intelligence and expert systems as a computer system designed to act as a substitute for a human expert in his/her particular field of knowledge.

The prediction about present and future impact of such technology has been made in 1995 by Jim Kaplan, audit manager of Fairfax County Internal Audit in Fairfax where he stated that "on the brave new audit world of cyberspace, auditors can identify innovative audit procedures; share computer assisted audit tools and techniques (CAATT); locate consultants; benchmark with other auditors; conduct preliminary planning by searching on-line for audit performed in a certain area; earn continuing professional education credit from office or home without incurring travel expenses; and lobby for audit-related legislation and the doesn't begin to scratch the surface of what's out there". The power of electronic resources to enhance auditing practices and process just keeps exploding. (17)

2.4.3 Information Technology Assessment and Adoption in Organisations

The success of management information technology in any organisation largely depends on the organisational process involved in information technology assessment and adaptation (18). In this context "Information Technology" refers to the broad range of technologies involved in information processing and handling, such as computer hardware, software, telecommunication and office information and includes such "techniques" as new systems development methodologies.

Assessment and Adoption" refers to the organisational policies, strategies and tasks employed, either explicitly or otherwise, by an organisation in its efforts to identify, acquire and diffuse appropriate information technology.

Gibson and Nolan (19) have also predicted that the introduction of new technologies can cause future stages in the life of organisation's information systems as follows:

"Stage one (initiation) is considered to be that state when a computer is first implemented in the organisation for the purpose of cost savings. Rarely, at this point, does senior management assess the long-term impact of the computer on personnel, on the organisation, or on its strategy.

State two is identified as a period of rapid "expansion'. The result is a steady and steep rise in expenditures for hardware, software and personnel. This period of unplanned growth is characterised by growing responsibilities of the EDP facilities and few explicit means of setting project priorities or crystallizing plans. It is believed that this stage often ends in crisis when top management becomes aware of the explosive growth of the activity and its budget, and decides to rationalize and coordinate the entire organization's EDP effort.

In stage three, the management tries to put a brake on runaway computer costs by "formalizing" the operation. This stage frequently includes the first formalization of management reporting systems for computer operation, a new charge-out system, and the establishment of elaborate quality-control measures. To manage the processes involved in this stage effectively, it is suggested tat organizations centralize certain components of the resources, install a steering committee and spread enough of the systems analysts through the company to ensure that users' needs are met adequately.

The "maturity" of information systems is identified as stage four. During this stage most of the funding for MIS development is devoted to applications touching directly on critical business operations.

However, one should realise that there are numerous factors that can affect the information requirements and consequently the management of information resources. Therefore, we can expect that very few, if any, organisations would follow all the above stages as proposed by Gibson and Nolan. Nevertheless, organisations need to develop appropriate mechanisms for adopting the available information technology. Management techniques applied in each of the four stages are given below:

Stage 1: Lax management

- ☞ EDP is organized under the department of first-applications justification; it is generally a small department
- ☞ Control notably lacking priorities assigned by FIFO; no charge-out
- ☞ Loose budget

Stage 2: Sales-oriented management

- ☞ The EDP manager is moved up in the organization: systems analysts and programmers are assigned to work in the various functional areas
- ☞ Lax controls, intended to engender applications development; few standards, informal project control
- ☞ Loose budget

Stage 3: Control-oriented management

- ☞ EDP moves out of the functional area of first application: a steering committee is set up; control is exerted through centralization; maintenance programming and systems programming become dominant activities.
- ☞ Proliferation of controls to contain in a runaway budget; format priority setting; budget justification. Programming controls: documentation, standards. Project management initiated; management reporting system introduced: Project plan, project performance, customer service, personnel resources, equipment resources, budget performance. Charge-out introduced; post-system audits. Quality control policies for computer system, systems design, programming, operations
- ☞ Strong budgetary planning for hardware facilities and new applications

Stage 4: Resource-oriented Planning & Control

- ☞ EDP is set up as a separate functional area, the EDP manager taking on a higher-level position: some systems analysts and sometimes programmers and decentralized to user areas; high specialization appears in computer configuration and operation; systems design and programming take on a consulting role

- ☞ Refinement of management control systems-elimination of ineffective control techniques and further development of others; introduction of database policies and standards; focus on pricing of computer services for engendering effective use of the computer
- ☞ Multiple 3-5 year plans for hardware facilities, new application and personnel

The main question remains to be whether the organisation is fully prepared to anticipate and manage technological changes.(20)

Vladimir Zwass (21) wrote in 1992 that "Our primary concern here is with organizational designs that support continuing innovation, as demanded by the information society. Our two continuing questions are: What kinds of organizational structures are able to take advantage of information technology to achieve competitive advantage in the marketplace? What forms of support to MIS offer organizations?

Today, the various components of MIS play an important role in supporting the work of organizational subunits. These various organizational levels and the information systems that give them support are shown in figure 2.1 below:

Figure 2.1: MIS support of various organization levels

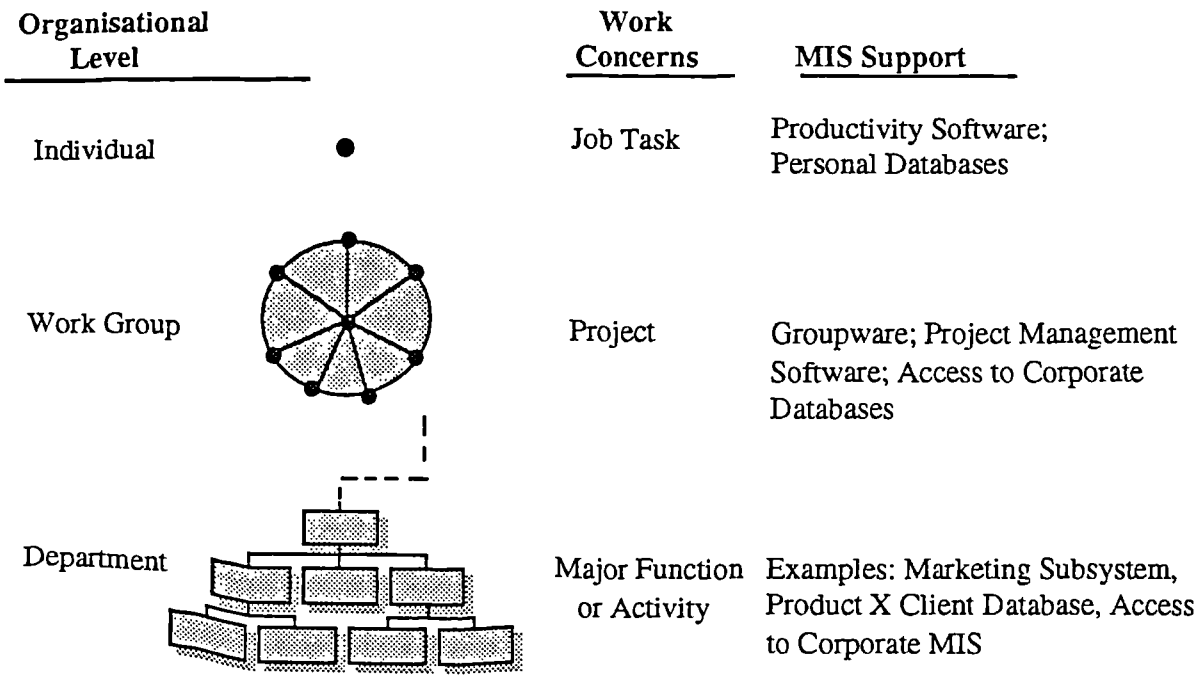
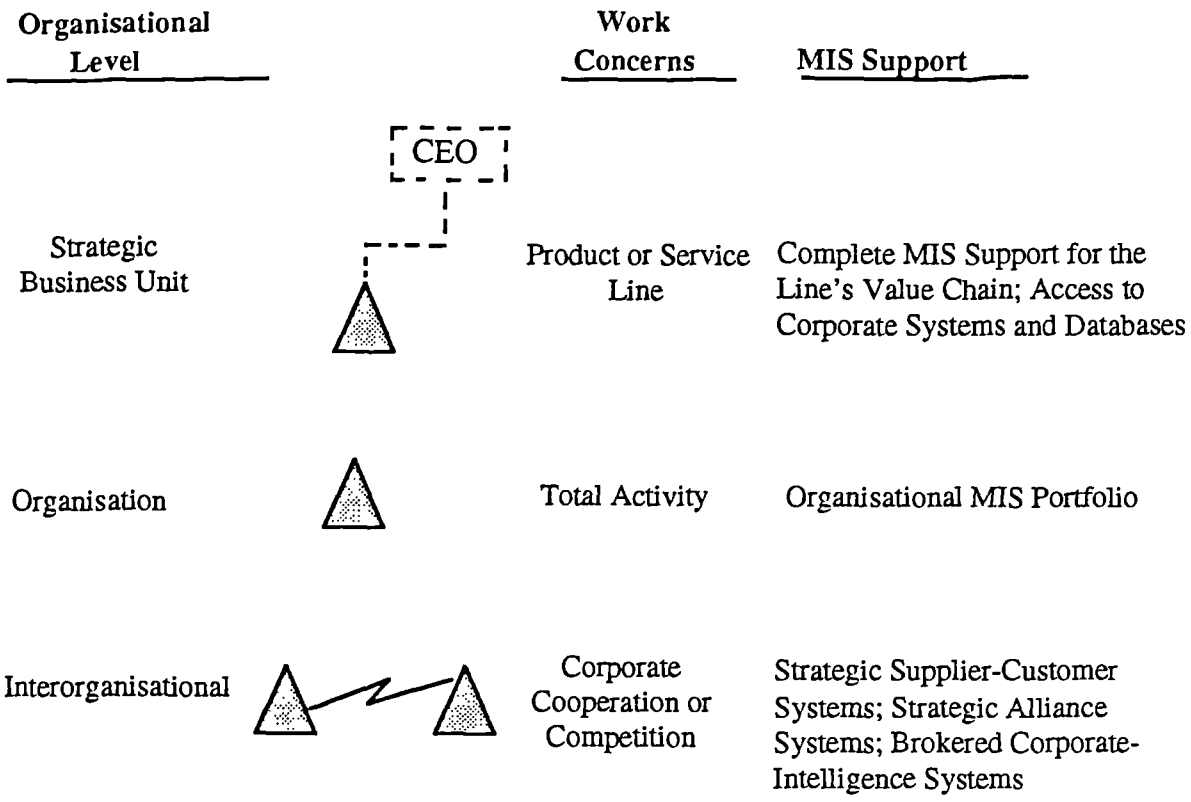


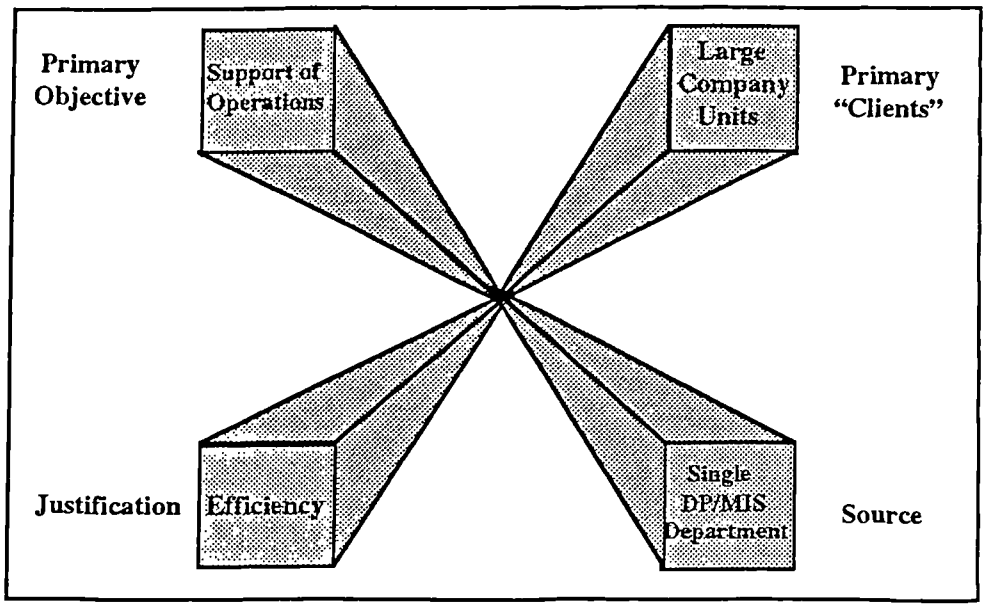
Figure 2.1: MIS support of various organization levels



The role played by information systems in organisations has evolved over time. The evolution has not led to wholesale discarding of the early types of systems - this would be quite expensive, and in many cases the older systems are still useful after suitable modifications. The progressive retargeting of MIS can be summarised as moving "up and out": progressive support of higher levels of management in increasingly individualised fashion, and aiming MIS at competitions to achieve strategic advantage (22)

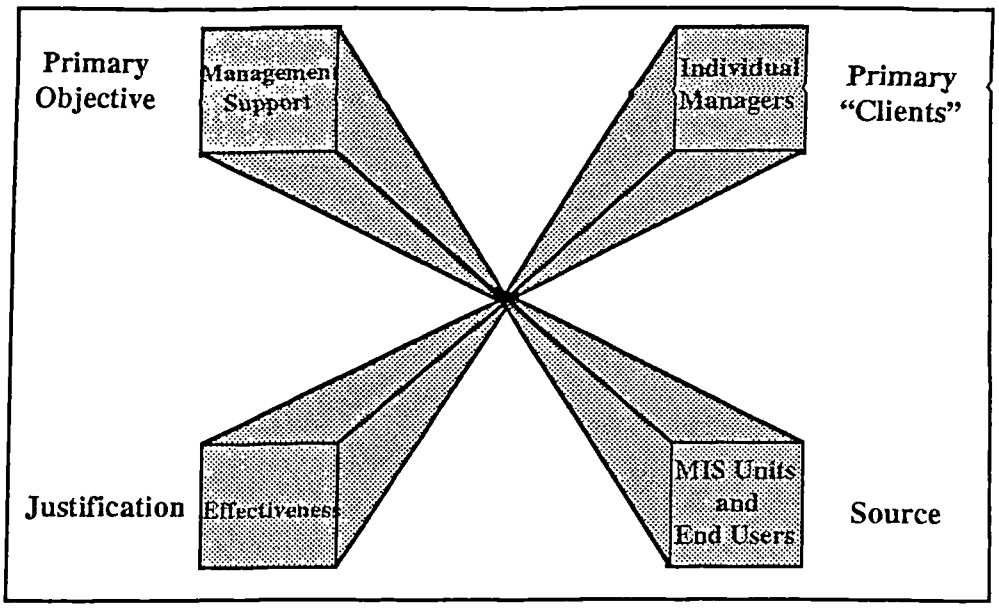
The following view of MIS evolution over three eras was adapted here from the work of James I. Cash, Jr. of the Harvard Business School (Cash, 1988) and is illustrated in the following figures:

Figure 2.2: MIS Environment: Era I (Data Processing), mid-1950s through mid-1970s



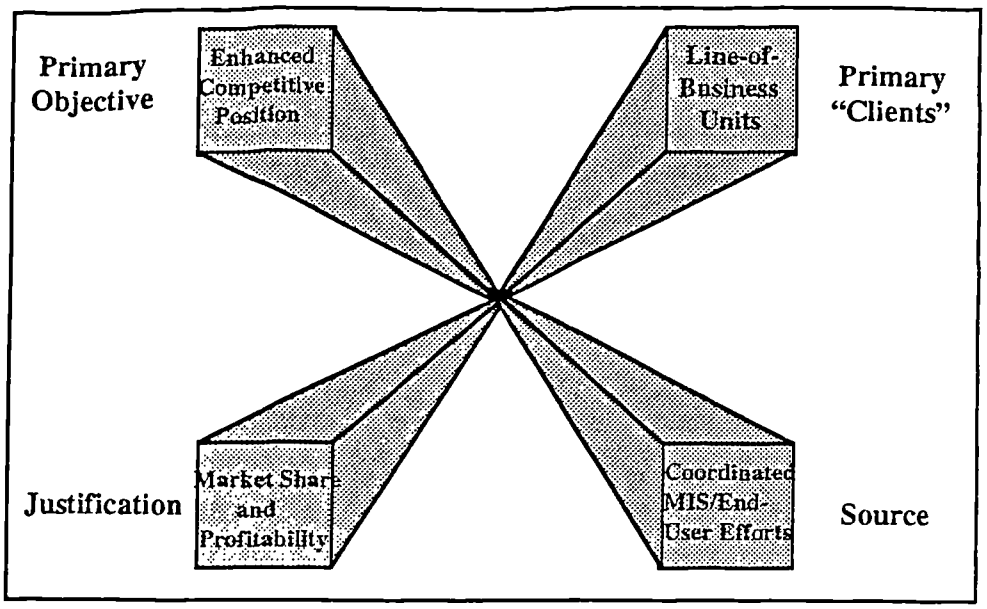
Source: John P. Gallagher, Knowledge Systems for Business, C 1988, pp. 7, 8. Adapted by permission of Prentice-Hall, Englewood Cliffs, New Jersey.)

Figure 2.3: MIS Environment: Era II (Management Support), mid-1970s through mid-1980s.



Source: John P. Gallagher, Knowledge Systems for Business, C 1988, pp. 7, 8. Adapted by permission of Prentice-Hall, Englewood Cliffs, New Jersey.)

Figure 2.4: MIS Environment: Era III (Competitive Positioning), mid-1980s through the present.



Source: John P. Gallagher, Knowledge Systems for Business, C 1988, pp. 7, 8. Adapted by permission of Prentice-Hall, Englewood Cliffs, New Jersey.)

From a user perspective computer-and communications-based information systems offer a set of capabilities to be brought out in the development of individual systems. As we will see, some of these capabilities help to provide dynamic action, while others help to maintain operational stability even as rapid change takes place.

The principal capabilities of information systems include:

1 Fast and Accurate Data Processing, with Large-Capacity Storage and Rapid Communication between Sites.

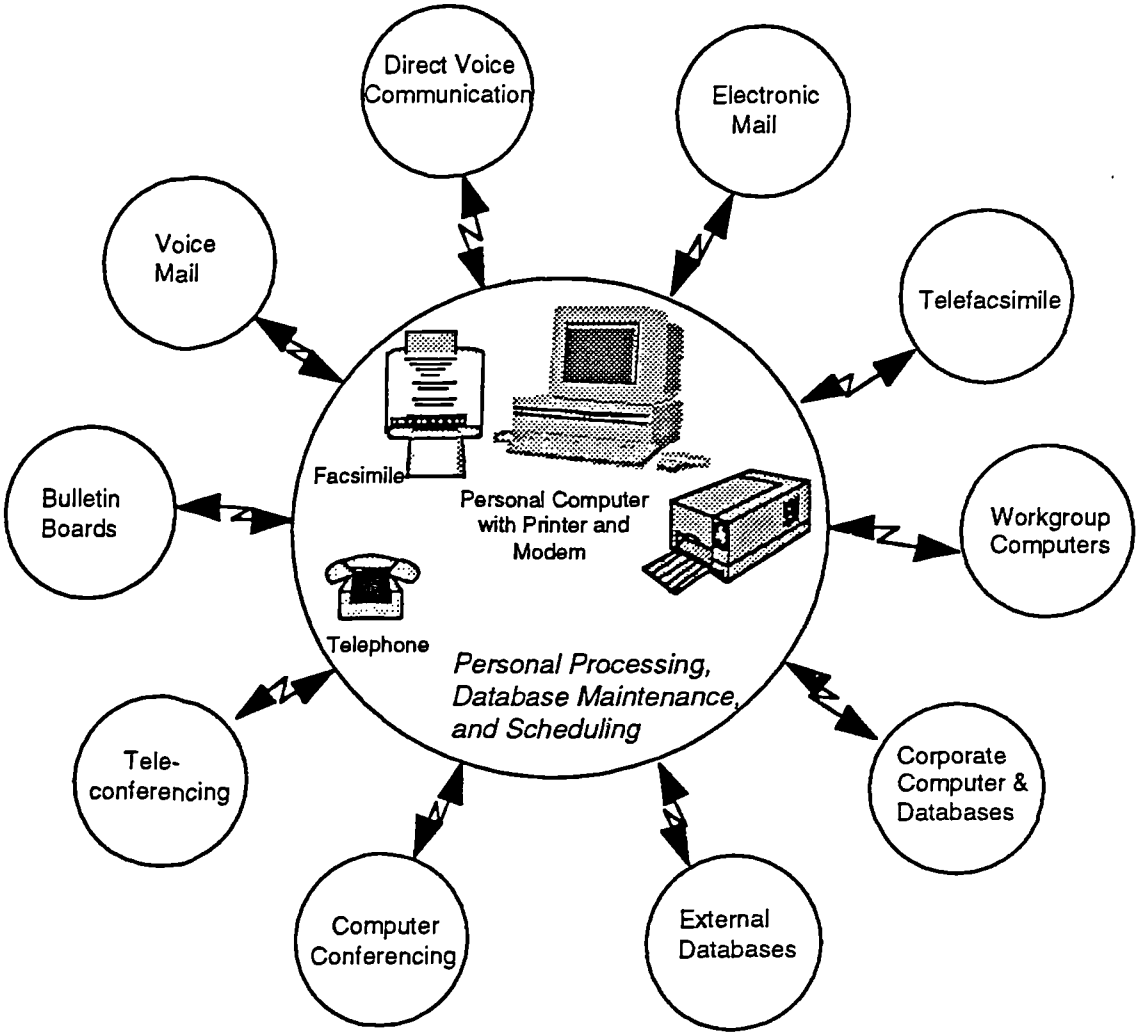
2 Instantaneous Access to Information

In on-line systems, the contents of a computer database are generally available for queries in subsecond time.

3 Means of Coordination

Information systems have become widely accessible, primarily as a result of the proliferation of personal computers acting as workstations connected to telecommunications networks. This has made MIS a tool for coordinating organisational activities. As depicted in the following figure:

Figure 2.5: The personal workstation on enabling tool.



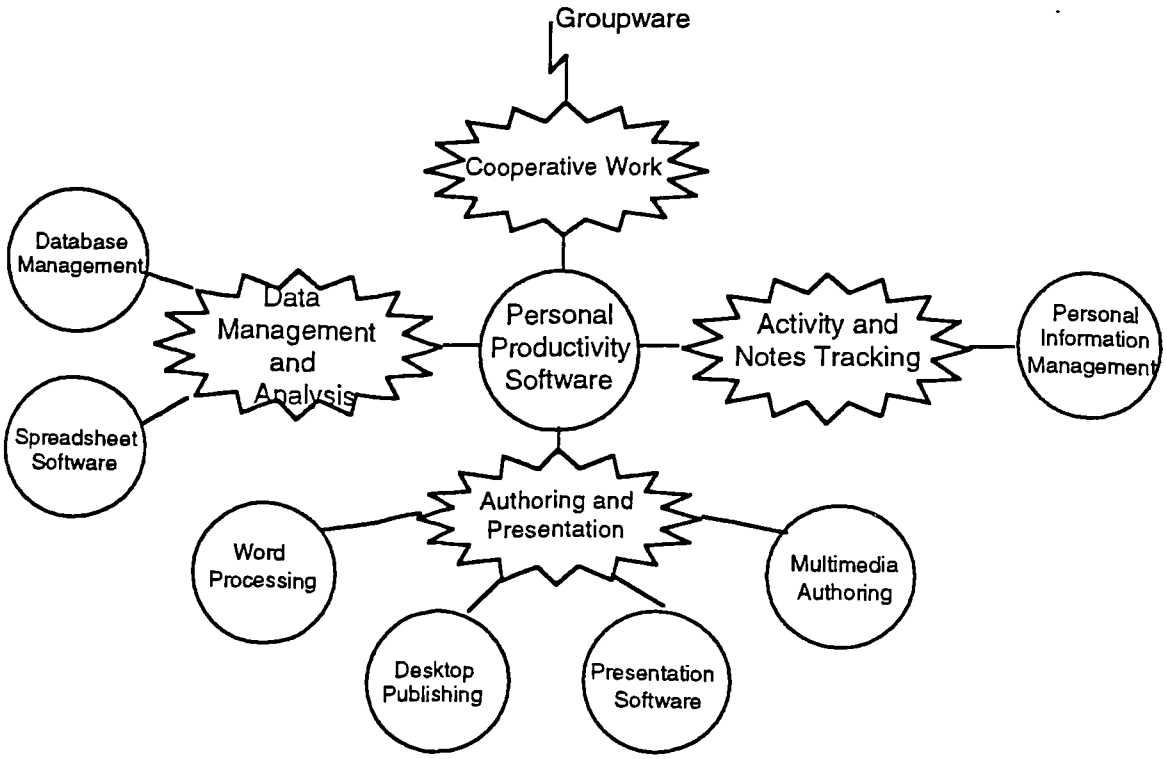
4 Boundary Spanning

Aside from the internal role played by MIS *within* an organisation, information systems increasingly serve to link an organisation to outside world. This be accomplished in a variety of ways, some of which may be decisive for business success is to for example, electronic data interchange (EDI) systems eliminate the exchange of paper transaction records, resulting in economy, speed, and reliability. Interorganisational systems connect suppliers with customers.

5 Support for Decision Making

Along with coordination, decision making is another basic aspect of management. All managerial functions, involve both coordination and decision making in varying degrees (23). As shown in the following figure.

Figure 2.6: Function and Categories of Personal Productivity Software.



Major advances, according to Walsh (24), in information technology continue to occur with great frequency. These include many advances which are clearly evolutionary in nature, representing straightforward and logical extensions to technology already in place. They also include changes which can be viewed as more revolutionary, since they have the potential to alter significantly either the uses or management of information systems. The ability of the organisation to recognise and act on both kinds of changes has important financial and strategic implications.

Evolutionary changes are more frequent now than at any time in the short history of data processing. Technology product cycles - for both hardware and software - are significantly shorter than they have been. The steady stream of such changes may have major consequences for many technology decisions; vendor and product selection, timing of hardware growth or software migration, method of acquisition for new systems, etc.. Poor or poorly timed choices may result in overspending to acquire the technology, large financial adjustments (eg. write downs or lease termination charges) or carrying out avoidable product conversions or migrations.

Revolutionary changes may have even more serious consequences to the organisation. These changes include new products or applications of technology which may shift the way a business operates or the competitive posture of organisations in an industry. In the past, such changes have ranged from the personal computer to automated teller machine. The penalty for failing to react may be steep, including operational cost disadvantage, loss of market share or even deterioration of public image. Conversely, organisations that anticipate and take full advantage of such changes may be well positioned to improve their competitive position.

Coping with technological change poses special problems. Many changes involve long lead times -sometimes measured in years - especially when significant software development is required. Today's integrated and interdependent system environments add geometrically to the complexity of seemingly straight forward changes. Often the magnitude of the long term investment entailed or affected by a technology decision may be larger than it appears.

The consequences of technological change and the problems surrounding it are large enough that most organisations must work actively to minimise them. For many companies, this should begin with a formal program to anticipate change through technology monitoring, ie. assessing important trends and new directions, and their implications for the business. Although comparatively few organisations seek to be on the "cutting edge" of technology (a Coopers & Lybrand sponsored study in the UK found that a scant 23% of senior commercial bank executives felt their companies were "trailblazers in the use of technology"), all need to consider future directions in their planning.

The approach to technology obsolescence will vary from one enterprise to the next, depending on company size, nature of the industry, and many other factors. In some organisations, it may be necessary to create a separate unit within the IS function to objectively assess changes in technology, it may also be adequate to subscribe to technology forecasting services and participate in seminars and conferences focused on relevant trends and directions. In every case, however, management should assign specific responsibility for forecasting and evaluating changes in technology and its impact on the organisation, and for planning of appropriate measures to take best advantage of them.

Due to the complexity and importance of change, close attention must be paid, according to the author, to the process by which major changes are implemented. Migrations or conversions from one application to another or from one operating vendor's hardware to another, are as difficult and involved as the word "migration" implies. The potential for costly delays and operational disruptions during major changes is very high, demanding thorough advance preparation and testing, and rigorous, well monitored procedures to manage and control the process.

Less obvious - and often overlooked in the urgency of change schedules - is the potential for interruption of the operation of normal controls during a major systems change. Controls that were adequate for the old environment are often less than adequate for the new environment, and even less so for the transition process between them. Thoughtful attention to internal control risks must be included in change control procedures and migration/conversion planning. Depending on the change, the exposure may be high enough to demand attention not just the control community (both internal and external auditors) but by senior management as well.

Rapid changes in technology will continue to be a fact of life for the foreseeable future, impacting every system decision as well as the operational stability of existing systems. Without a formal program to monitor and evaluate future technology directions, the organisation will risk excessive costs and strategic disadvantage in its marketplace. Without a well disciplined and well controlled process for managing the implementation of changes, the organisation may face serious and costly operational disruptions.

2.5 Transfer of Information Technology

Computer systems have largely been developed for western countries by western companies. Technology transfer as described by Gee Sherman in 1981 (25) is the application of technology to a new use or user.

The transfer of technology between developed and developing nations according to a world survey of executives published in 1975, has grown vastly within the past two decades and it seems as if the growth trend will continue. The term "technology" means machinery, equipment, products, patents, licences, trade marks, blue prints, process, designs and techniques such as marketing and advertising, accountancy, personnel management and general management (26). Growth in transfer of technology in the 1990's in the opinion of the researcher between developed and developing nations is accelerating beyond anyone's expectation. This is primarily attributed to a number of factors including improved communications, increase in number of users, reduced prices of hardware and software and miniaturisation of components.

The idea that the transfer of technology to developing countries will bring increased economic opportunities stems from Restow's (27) economic model. The transfer of most commercial technology is accomplished through multinational corporations.

Identifying the appropriate technology to import is a difficult task for user enterprises in developing countries. It has been found that managers in these countries tend to lack the ability to identify and apply the technology necessary to solve their problems; there is need for new programs that will enable firms, through stronger management skills, to use the existing information technologies in their operations in these countries (28).

As early as 1966, Kat and Kahn have proposed that the most important tendencies of organisation is growth dynamics (29). The appearance of new markets (for example, oil-rich developing countries), enables many organisation to grow at a much faster pace.

Gee has pointed out in 1981 that in order for the implementation of new technology to be effective "managers must be innovation-oriented, they must be sensitive to the environment, there must be an understanding of the users needs, effective communication channels must exist, strong individuals committed to expanding the new technology must be present and there must be an organisation-wide identity and support for the particular new technology (30).

The above proceedings suggest that in order to implement new technology effectively, it must be done gradually over a long period of time. This implies that innovators may have to plan change by using both empirical and theoretical models as guides to action. Wallender III concluded in 1979 that managers in developing countries need to develop the ability to plan; they need organisational capabilities and the ability to diagnose and solve the problems (31).

Shrivasava worte in 1984 an article entitled "Technology Innovations in Developing Countries" that the rational or logical innovative choices must be made. For example, does the organisation need advanced technology, or obsolete, labour-intensive technology or advanced technology in one area and obsolete technology in another area? For instance, in some sectors of the economy, there may be a need for "adaptive technological innovation", which are relevant to the modern industrial sector of developing nation economies, and aim at modifying and adapting modern technologies to the needs of local markets (32). On the other hand, some may require transformative technological innovations, which "are relevant to the traditional sector of developing nation economies, and aim at transforming the traditional sector economically, socially and culturally". In addition, the standard management functions of leadership, co-ordination, planning and staffing are also needed to change. (33) According to Bennis, the only way to change organisation is to change their culture, ie. to change the systems within which people work and live (34).

Hall stated that organisation development would seem ultimately to lie with individual development. Individual development, according to Hall, entails reconstruction of existing individual constructs (35).

Singh gave five conditions of successful technology transfer:

- willingness of the transferer and the transferee must exist;
- there must be a stable and efficient government;
- the importer must process effective ready programs;
- there must exist an appropriate educational system; and
- the proper planning for importing the appropriate technology must exist (36).

In the view of the Researcher, some of the above conditions may not prevail in the Middle East in the very near future because there is no apparent proper planning by governments to import the appropriate technology and not all government may be classified as stable and efficient.

2.6 Role of transnational corporations in the transfer of information technology

2.6.1 The role of transnational corporations in new technologies

Transnational corporations have played a critical role in the development, application and dissemination of new and emerging technologies in diverse fields. In the computer sector, a series of new technological developments have taken place through major transnational corporation, particularly IBM, but also by other transnational corporations, such as Unisys, Hewlett Packard and others in the United States and by NEC, Fujitsu, Hitachi and others in Japan and Philips, Siemens, ICL, Olivetti and others in Western Europe. At the same time, a number of relatively new manufacturers of smaller computers, such as Apple, have also had considerable technological impact. In telecommunications, Bell Laboratories (AT&T) and transnational corporations, such as ITT, GTE, Ericson and others have provided a series of major innovations. In electrical equipment, transnational corporations, such as General Electric, Westinghouse, Siemens, Asea-Brown Boveri and others have achieved significant technological developments. Transnational corporations in chemicals and petrochemicals have played a major part in the development of polymers, reinforced plastics and various composites. Such major transnational corporations as General Motors, Ford, Toyota, Mazda, Fiat and others in the automotive sector have introduced several innovative developments in automobile designs and production, including the use of substitute materials. In fields such as advanced ceramics and photovoltaics for harnessing solar energy, transnational corporations in the United States, Japan and Western Europe are undertaking major research efforts to achieve a leading edge in the development and application of such technologies.

It must be emphasised that most major transnational corporations, recognizing the key importance of new and emerging technologies, have undertaken extensive research programmes. Transnational corporations, such as IBM, Compac , Microsoft, AT&T, Digital and others have allocated funds ranging from $1.5 to $3 billion annually for research and development. While such research allocations have proved worthwhile, a number of small, research-intensive companies which have emerged mostly in the United States have also contributed significantly to innovative applications and products in computers, semiconductors and communications as well as to biotechnology and developments in material sciences (37).

2.6.2 Transnational Technology Market

With the increasing internationalisation of the electronics industry and the rapid pace of innovative developments, the technology market for this sector is becoming increasingly imperfect, with various alternative technologies and sources, but with a high level of product differentiation. The market for electronics technology has undergone considerable change since the 1960s and early 1970s. With respect to consumer electronics, technology is available from several alternative sources. However, while certain European transnational corporations, such as Philips continue to be major producers, Japanese transnational corporations have assumed increasing global dominance for most major products and for innovative developments. It is, however, with respect to computers and related fields that the technology market has expanded most significantly. Earlier, some corporations particularly IBM, had a predominant role in computers and related electronics products and applications. IBM continues to be dominant in mainframe computers and an industry leader for several other products, but a number of other companies, including some from Japan, have become increasingly competitive in most fields, particularly in microcomputers and semiconductors. Other major transnational corporations have played a dominant role in developing new technologies for communications such as AT&T, Alcatel, Siemens and Ericsson and yet others in specific fields of consumer and industrial electronics and other applications. Recent sales and profits of some of the major transnational corporations in the electronics sector may be seen in an annexture to this chapter. In recent years, however, there has been considerable technological diffusion and a large number of new entrants have entered electronics production particularly after the advent of microcomputers. They can provide technology and know-how for a growing range of electronics products and components. This development has taken place largely because of extensive technology licensing, particularly by United States corporations to Japanese companies, and also to several corporations in Western Europe, during the 1960s and early 1970s particularly in computers, semiconductors and communications technologies.

New technological applications and products have also been developed by a large number of enterprises which were often small but have grown rapidly in recent years. This is particularly true of software development in the United States. The capability to replicate and adapt existing products and to innovate new products and applications has also led to the development of a fairly extensive market for technology and know-ho, particularly in the United States, Japan and in West European countries. Replication and packaging of "electronic kits" for assembly of various electronic products, including for desk-top, personal computers and peripheral equipment, has also developed fairly extensively in certain South-East Asian countries particularly South Korea and Taiwan. At the same time, there is also a high degree of product differentiation and similar products may be substantially differentiated in value because of particular brand names (38).

An important aspect of technology transfer, particularly of advanced sophisticated electronics technologies from the United States, however, has been the considerable restrictions placed on exports of both equipment and technologies falling into certain categories. These restrictions which have been imposed for security reasons, are supervised by United States authorities and by a Co-ordinating Committee (COCOM) of 15 NATO members and Japan.

The spectacular growth of electronics has resulted in considerable problems relating to intellectual property rights, including copyrights on software. Intellectual property legislation in several countries has not taken adequate account of the rapid developments in the electronics sector. Considerable litigation is taking place, particularly in the United States, on the scope and coverage of patents and copyrights in the electronics sector. In several countries, copyrights on software are not recognized and the same software is available at much lower prices. There is considerable divergence of views between industrialized property litigation, which can have important effects on technology transfer negotiations and contracts in this field.

While electronics production is essentially knowledge-intensive and subject to economies of scale for certain products, such as chips, it is possible to undertake manufacture at various levels of production and local integration. The manufacture of silicon or gallium arsenide chips is, of course, highly expensive, but standard chips and integrated circuits have become relatively cheap and readily available. The assembly of several electronics products can be undertaken with relatively limited investments and with gradual backward integration. The production of software also involves very low investment and joint ventures and technology licensing arrangements are extending in this subsector as well. (39)

Growth estimates of world production of information technology upto 1995 is given in table 2.5 below:

Table 2.4: Growth estimates of world production of information technology systems, 1986-1995

(Billions of US dollars)

Item	1990	1995	Percentage average annual growth
Hardware	343	621	12
Software	174	433	20
Telecommunications b/ and computing services	107	143	6
TOTAL	634	1,197	13

Source: D. Kimbel, "Information technology in OECD countries", OECD Reporter, (October 1987).

Clive Cookson stated in an article published in the Financial Times on February 22, 1989 that worldwide software sales in 1989 exceeded $100 billion. According to Dataquest, the US market research company and they are likely to rise by more than 20 percent per year for the foreseeable future.

According to the author, in the highly fragmented world software market the best organised players on the international stage are the large computer manufacturers, following IBM's lead and well aware that for the industry as a whole there is much more growth potential in software and services than in hardware (40).

This growth potential in the view of the researcher has attracted a number of international accounting and management consultancy firms to enter the software market products and methodologies. Manufacturers such as ICL and Wang and information technology consultants such as Touche Ross and Ernst & Young have developed methodologies and software products to enable commercial companies to carry out information re-engineering called variously "Business process management", "Procedure processing" or even "Process Processing", their aim is to help offices analyse how they work and look for improvements. Then a new "workflow" process is devised and the technology implemented. (41)

The demand for packaged software will continue to grow rapidly for various reasons: Earlier software is becoming obsolete; there is lack of standardisation; user friendly systems for multiple applications are in great demand; and a variety of new features are expanding the software market. (42). According to a recent article published in the "Gulf News" that software developers have developed a micro chip which acts like human brain cell. According to Boyce Resenberger:

"In a major step toward building an artificial brain and other "intelligent" machines, scientists at Caltech and Oxford have created a silicon chip that behaves much like a human-brain cell.

The device, which they call "a silicon neuron" and whose circuitry is explicitly modelled on the structure and internal workings of neurons in the cerebral cortex, is unlike conventional computers because instead of working digitally, it operates in the analogue mode - the same way a living brain works. Moreover, the device is so energy efficient that it uses only one ten-millionth as much power per operation as does a comparable digital chip.

The feat - along with the earlier development of a "silicon retina" that works so much like a real eye that it is even fooled by the same optical illusions that trick humans - marks a significant advance in a field of computing that has long been overshadowed by digital machines.

"This is really exciting work," said Terrence Sejnowski of the Salk Institute in La Jolla, California, a leader in the field. "This is an impressive new direction." Sejnowski said the new approach could do as much to advance understanding of the brain as genetic-engineering techniques have done so to shed light on living cells.

While the immediate goal is to study the brain, the researchers say practical applications are inevitable. One possibility is a device that recognises a person's voice or face, and then unlocks the front door; to it could be linked to digital computers so that they could understand English spoken in any conversational syntax. (43).

Annexture: Sales and profits of major transnational corporations in electronics.

(Million Dollars)

Company	Main Activity	Period	Period End	Revenues	% Change	Net Profit/ Loss	Previous P/L
Acer Group Inc	PCs	1993	31 Dec	1,900.0	59%	n/a	n/a
Adobe Systems Inc	Publishing software	4Q93	26 Nov	86.5	22%	15.8	8.4
		1993		313.5	18%	57.0	43.6
Advanced Logic Research	PCs/servers	1Q94	31 Dec	49.6	17%	0.5	-1.8
Advanced Micro Devices Inc	Semiconductors	4Q93	26 Dec	413.4	3%	41.6	69.6
		1993		1,648.3	9%	228.8	245.0
Amdahl Corp	Large systems	4Q93	31 Dec	442.9	-41%	- 40.9	2.5
		1993		1,680.5	-33%	-580.0	- 7.0
Apple Computer Inc	PCs	1Q94	31 Dec	2,468.8	23%	40.0	161.3
Artisoft Inc	LAN software	1Q94	31 Dec	21.2	-11%	3.1	3.4
ASK Group Inc	Database/manufacturing s/w	2Q94	31 Dec	100.6	-11%	-13.7	3.6
Bachman Infor Sys	Software engineering	2Q94	31 Dec	9.5	-3%	-3.6	-3.9
BMC Software Inc	Performance monitoring s/w	3Q94	31 Dec	75.5	16%	23.1	17.3
Bolt Beranek Newman	Network products	2Q94	31 Dec	48.4	-19%	-1.7	-25.1
Boole & Babbage Inc	Systems management software	1Q94	31 Dec	31.1	6%	2.1	1.8
Borland International	PC applications	3Q94	31 Dec	111.7	7%	0.4	-61.3
CACI International	Software and services	2Q94	31 Dec	44.0	18%	1.5	-0.2
Cadence Design Systems Inc	Design automation software	4Q93	31 Dec	106.1	-9%	-1.0	20.0
		1993		368.6	-12%	-12.8	55.4
Caere Corp	Document scanning software	4Q93	31 Dec	9.8	-20%	0.2	2.2
		1993		33.2	-23%	-1.0	7.4
Cheyenne S/W Inc	LAN software	2Q94	31 Dec	22.8	111%	8.7	4.3
Claris Corporation	Business software	1Q94	25 Dec	44.9	17%	n/a	n/a
Comdisco Inc	Computer leasing	1Q94	31 Dec	536.0	-6%	23.0	40.0
Compaq Computer Corp	PCs	4Q93	31 Dec	2,202.0	55%	151.0	89.0
		1993		7,191.0	75%	462.0	213.0
Computer Associates Int Inc	Software products	3Q94	31 Dec	574.4	15%	124.2	80.2
Comshare Inc	Managerial decision support s/w	2Q93	31 Dec	23.8	-12%	1.1	0.3
Conner Peripherals Inc	Storage systems	4Q93	31 Dec	574.4	-7%	8.5	8.5
		1993		2,151.7	-4%	-445.3	121.1
Continuum Co	Insurance software	3Q93	31 Dec	64.7	10%	4.2	0.3
Corel Corp	Graphics software	4Q93	30 Nov	38.2	87%	9.2	3.2
		1993		140.2	56%	27.8	11.2
Cray Electronics	Comms, software & services	1H94	31 Oct	£ 113.9	62%	£ 5.2	£ 16.1
Cray Research Inc	Supercomputers	4Q93	31 Dec	302.6	33%	24.3	-26.5
		1993		894.9	12%	60.9	-14.8
Creative Technologies Ltd	Sound/image boards	2Q94	31 Dec	183.4	114%	33.0	22.3
Cypress Semiconductor	Semiconductors	4Q93	3 Jan	83.0	23%	-4.1	-23.7
		1993		304.5	12%	8.0	-21.0
Data General Corp	Computer systems	1Q94	31 Dec	261.2	-6%	-21.1	0.8

Source: Computer Business Review, January 1994

(Million Dollars)

Company	Main Activity	Period	Period End	Revenues	% Change	Net Profit/ Loss	Previous P/L
Digital Equipment Corp	Computers	2Q94	1 Jan	3,254.1	-12%	-72.1	-73.9
Emulex Corp	Network/interface h/w	2Q94	26 Dec	23.0	-14%	-15.9	2.2
Exabyte Corp	Tape storage	4Q93	1 Jan	83.2	18%	5.9	5.3
		1993		310.3	8%	16.2	20.5
General Automation Inc	Pick systems	4Q93	30 Sep	10.4	2%	-1.0	-0.2
		1993		42.9	-5%	-0.6	0.1
General Datacomm Ind	Datacomms products	1Q94	31 Dec	48.1	-11%	-2.0	1.6
Gupta Corp	Client/server	4Q93	31 Dec	18.0	64%	3.0	1.0
		1993		56.1	71%	5.6	1.8
IBM Corp	Computer systems	4Q93	31 Dec	19,396.6	-1%	382.0	-5,463.0
		1993		62,716.0	-3%	-8,13.7	-4,965.0
IMRS Inc	Financial management s/w	2Q94	31 Dec	19.2	37%	2.0	1.4
Intel Corp	Semiconductors	4Q93	25 Dec	2,389.0	29%	594.0	429.0
		1993		8,782.0	50%	2,295.0	1,067.0
Integraph Corp	CAD systems	4Q94	31 Dec	268.5	-13%	-69.9	-2.0
		1993		1,050.3	-11%	-116.0	8.4
Interleaf Inc	Desktop publishing	3Q94	31 Dec	28.4	-8%	0.0	3.0
Knowledgeware Inc	Software engineering	2Q94	31 Dec	38.2	17%	2.1	1.0
Landmark Graphics	Oil industry software	2Q94	31 Dec	30.1	47%	3.1	0.7
Lotus Development Corp	PC software	4Q93	31 Dec	278.3	13%	29.6	14.6
		1993		981.2	9%	55.5	80.4
Madge NV	Networking products	4Q93	31 Dec	44.7	65%	5.4	2.2
		1993		145.4	16.6%	16.6	7.5
Marcan Corp	Manufacturing software	1Q94	31 Dec	46.6	76%	1.3	1.1
McAfee Associates	Compression software	4Q93	31 Dec	5.0	31%	1.9	1.8
		1993		17.9	31%	7.3	6.4
McDonnell Douglas IS	Systems supplier	1993	31 Dec	£ 149.0	-6%	£ 22.0	£ 19.0
Memorex Telex NV	Storage systems	3Q94	31 Dec	234.2	-31%	28.6	-53.1
Micrografx inc	Graphics software	3Q94	31 Dec	18.0	0%	-1.1	1.1
Microsoft Corp	Software products	2Q94	31 Dec	1,129.0	20%	289.0	236.0
Misys Plc	Software and services	1H94	30 Nov	£ 42.1	2%	£5.5	£ 4.5
Netframe Systems Inc	Network servers	4Q93	1 Jan	20.1	69%	1.2	1.2
		1993		66.9	71%	7.2	3.2
Network Computing Dev	Network equipment	4Q93	31 Dec	38.0	7%	2.1	2.5
		1993		144.5	20%	9.2	6.1
Network General Corp	Network management systems	3Q94	31 Dec	28.8	20%	4.8	3.6
NCR (AT&T Global)	Computer systems	4Q93	31 Dec	2,300.0	7%	n/a	n/a
		1993		7,260.0	2%	n/a	n/a
Olivetti	Computer system	1993	31 Dec	5,041.0	7%	n/a	n/a
Parametric Technology	Mechanical design s/w	1Q94	1 Jan	53.5	65%	14.6	8.3
Platinum Software Corp	Accounting software	2Q94	31 Dec	17.2	126%	-7.1	0.7

Source: Computer Business Review, January 1994

(Million Dollars)

Company	Main Activity	Period	Period End	Revenues	% Change	Net Profit/ Loss	Previous P/L
Powersoft Corp	Accounting software	4Q93	31 Dec	19.5	144%	2.8	2.2
		1993		51.0	141%	8.1	3.5
Progress Software Corp	Development tools/ databases	3Q93	30 Nov	32.5	33%	4.1	3.0
Pyramid Technology Corp	Unix systems vendor	1Q94	31 Dec	60.0	9%	0.6	0.5
Quantum Corp	PC disk drives	3Q94	2 Jan	523.0	14%	6.1	28.0
Quarterdeck Office Sys Inc	PC management software	1Q94	31 Dec	9.2	-24%	-0.6	0.4
Qume Corp	Display systems	3Q94	30 Nov	14.9	-38%	-8.5	-1.9
Radius Inc	Display terminals	1Q94	31 Dec	39.5	7%	0.7	-0.7
Ross Systems Inc	Accounting software	2Q94	31 Dec	17.2	-25%	-7.0	1.5
Santa Cruz Oper	Systems software	1Q94	31 Dec	41.6	-7%	1.5	3.6
Seagate Technology Inc	Disks	2Q93	31 Dec	815.9	5%	42.7	63.3
Sequent Computer Systems	Computer Systems	4Q93	1 Jan	104.3	18%	-15.1	6.3
		1993		353.8	15%	-7.5	14.4
Sequoia Systems Inc	Computer Systems	2Q94	2 Jan	11.1	1%	2.4	-19.6
SHL Systemhouse Inc	Systems integration	1Q94	30 Nov	201.2	33%	3.5	2.0
Silicon Graphics Inc	Workstations/chips	2Q94	31 Dec	370.4	37%	36.3	22.0
Softkey Software Prod	Development software	3Q94	31 Oct	9.6	-3%	0.0	
Software Publishing Corp	PC applications	1Q94	31 Dec	22.7	-38%	0.4	4.2
Stac Electronics	Data compression software	1Q94	31 Dec	6.1	-50%	-1.0	2.2
Storage Technology Corp	Storage products	4Q93	31 Dec	400.2	-5%	6.3	-10.0
		1993		1,404.8	-9%	-77.8	9.3
Stratus Computer Inc	Computer systems	4Q93	31 Dec	148.1	10%	-17.1	17.2
		1993		513.7	6%	16.6	56.9
Sun microsystems Inc	Unix systems	2Q94	26 Dec	1,130.0	8%	43.8	24.1
Sybase Inc	Database software	4Q94	31 Dec	137.8	66%	17.8	10.7
		1993		426.7	61%	44.1	23.7
Symantec Corp	PC utility dev s/w	3Q94	31 Dec	67.1	9%	-9.2	-11.5
Synopsys Inc	Electronic design software	1Q94	31 Dec	34.0	60%	4.4	2.4
SynOptics Comms Inc	Data switching devices	4Q93	31 Dec	188.3	44%	23.8	16.9
		1993		704.5	81%	75.9	42.4
Systems Union Group Ltd	Business and accounting s/w	1993	31 Dec	£ 17.7	46%	£ 1.8	£ 1.5
Tandem Computers Inc	Fault tolerant computers	1Q94	31 Dec	475.6	-2%	24.9	17.5
Texas Instruments	Semiconductors/ electronics	4Q93	31 Dec	2,374.0 66.9	19%	134.0	78.0
		1993		8,523.0	92%	472.0	274.0
Tricord Systems Inc	Network servers	4Q93	31 Dec	38.0	69%	1.2	1.2
		4Q93	31 Dec	29.2	156%%	4.1	0.5
		1993		80.0	140%	9.0	-3.3

Source: Computer Business Review, February 1994

(Million Dollars)

Company	Main Activity	Period	Period End	Revenues	% Change	Net Profit/ Loss	Previous P/L
Unisys Corp	Systems vendor	4Q93	31 Dec	2,101.1	-7%	117.7	139.2
		1993		7,742.5	-8%%	565.4	361.2
Wall Data Inc	PC/host connecti-vity s/w	4Q93	31 Dec	22.0	86%	4.7	3.1
Wang Laboratories	Office systems	2Q94	31 Dec	231.8	-34%	4.9	0.4
Wellfleet Commu-nications	Routers/bridges	2Q94	31 Dec	87.7	119%	13.8	6.0
Western Digital Corp	Disk drives/graphics chips	2Q94	25 Dec	371.1	8%	12.5	6.9

Source: Computer Business Review, February 1994

REFERENCES

CHAPTER TWO

1 Heyel C., "Electronic Data Processing" - The Encyclopedia of Management, Van Nostraand Reihold Co. pp 249-250.

2 Palmer, Ray, "Offic Automation a Systems Approach" - (South - Western Publishing Co. 1987.) PP 13.

3 Wilkinson G. G. Winterflood A. R. Fundementals of Information Technology" John Wiley & Sons Ltd, 1987 - p 4.

4 Staff Writer - "Qunatum Chips" - Gulf News, Abu Dhabi, 25 March 1991.

5 Wilkinson G. G., Winterflood, OP., CIT p 4.

6 Burger R. M, Holton W.C.A.D, Sumney L.W. (1984). The impact of IC's on computer technolog, "Computer", October pp 88-95.

7 Bird J. "Computers Will Be Everyone's Little Helpers" - The Sunday Times, 31 December 1989.

8 Pannell B.K., Jackson D.C. Lucas S.B Make A Success of Microcomputers in Your Busniess" Enterprise Books 1983 - p 2.

9 Davis G.B., "Management Information Systems; Conceptual Foundations, Structure, and Development", McGraw Hil, 1974 - p 3.

10 Simons G. "Introducing Software Engineering" NCC John Wiley & Sons, Ltd., 1987 - p 1.

11 Pannell, Jackson, Lucas Op.Cit p 15

12 Davis Op.Cit p 233

13 Walsh A.M, "The Handbood of Information Technology" Richard De Boo Ontario, November 1990 - pp 113

14 Pannell, Jackson, Lucas Op.Cit, p 21

15 Wilkinson Op.Cit, p XIII.

16 Walsh Op.cit, p 113

17 Kaplan J., an auditor's guide to electronic audit resources the internal auditor, February 1995, pp 23

REFERENCES

CHAPTER 2 continued

18 Huff S.D. and Munro M.C., "Information Technology Assessment and Adoption: A Field Study". MIS Quarterly, Volume 9, No. 4, December 1985 - pp 327 - 339.

19 Gibson C.F.S Nolan R.L., "Managing the Four Stages of EDP Growth" - Havard Business Review - Vol. 52, No. 1, January - February 1974, pp 76-88.

20 Benbasat I., Dexter A.S., Drury D.H., goldstein R.C, "A Critique of the Stages Hypothesis; Theory and Empirical Evidence" - Communications of ACM, Volume 27, Number 5, May 1984 - pp 76-85.

21 Zwas, Vladimir., "Management Information Systems" (WM.C. Brown Publishers, 1992) PP 446 - 447.

22 IBID PP 67 - 69.

23 IBID PP 63 - 64.

24 Walsh, Op.Cit pp 11-18

25 Sherman G., Technology Transfer, Innovation & International Competitiveness (New York: John Wiley & Sons, 1981) p 18.

26 Boshe J.R., Duerr M.G., International Transfer of Technology: a World Survye of Executives (New York: The Conference Board, Inc. 1975), P. 1.

27 Walt R.W. The Stages of Economic Growth: A Non-Communist Manifesto (New York: Cambridge University Press, 1967)

28 Wallender III and Harvey W., Technology Transfer and Management in Developing Countries: Company Cases and Policy Analysis in Brazil, Kenya, Korea, Peru and Tanzania. Executive Summary, (New York: Fund for Multinational Management Education, 1979) - pp 1-3.

29 Katz D., & Kabn R.L., The Social Psychology of Organisations (New York: John Willey & Sons, 1966) - pp 304-307.

30 Sherman, Op.Cit. - p 4.

31 Wallender III, Harvey, Op.Cit. - p 4.

32 Shrivastava P., "Technological Innovation in Developing Countries" - Columbia Journal of World Business - Vo. XIX No. 4, Winter 1984 - p 26.

REFERENCES

CHAPTER 2 continued

33 Shrivastava, Op.Cit, p 28.

34 Warren B.G., Organisation Development: Its Nature, Origins and Prospects (Reading, Mass.: Addison-Wesley - 1969) p.V.

35 Hall J., "Models for Management: As Alternative to Techniocentric Atheoretical OD Intervention" W W Burke (ed). "New Technology in Organisations Development - (La Jolla, Calif.: University Associates, 1975), p 50.

36 Transister and Electronic Development: Models and Practices for the Developing Countries (Jersey City, NJ: Unz. & Co., division of Scott Printing Corp. 1983) - pp 36-42.

37 Transational Corporations and The Transfer of New and Emerging Technologies to Developing Countries. United Nations Publication, New York 1990 pp 17-18.

38 IBID PP 27-28

39 IBID p 28

40 Cookson C., "Software Sales Top $100BN A Year" Financial Times, London, U.K., 22 February 1989.

41 Financial Times Survey "Office Technology" Financial Times London, U.K., 8 October 1991.

42 Transational Corporations, IBID p 50.

43 Resenberger, B "Chip Acts LIke Human Brain" Gulf News, Abu Dhabi, U.A.E., 27 January 1992.

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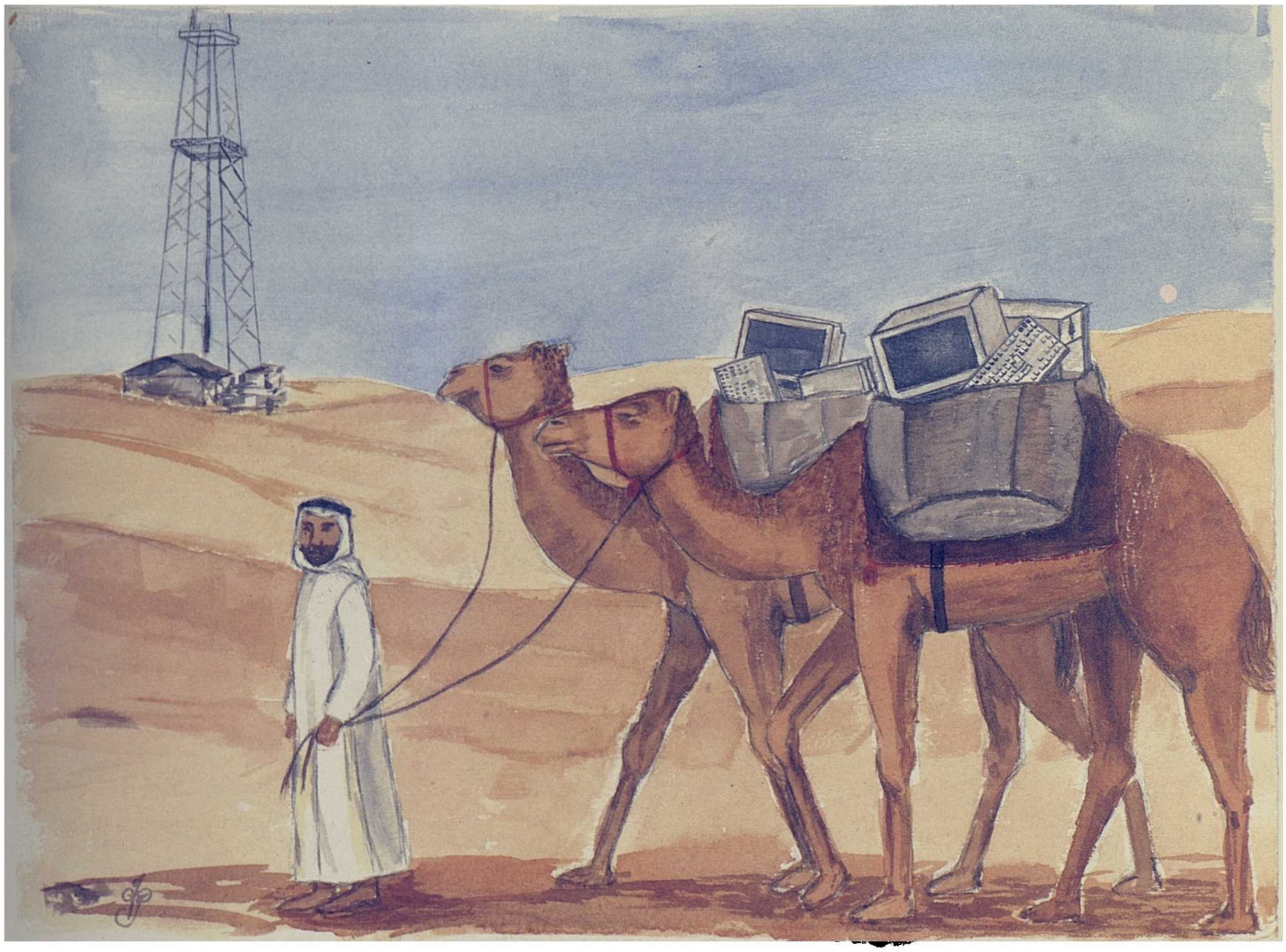
The Impact of Computer Technology on Accounting and Auditing in the Middle East with Special Emphasis on Arabisation, Transfer of Technology and Training



CHAPTER 3

THE INTER RELATIONSHIP BETWEEN INFORMATION TECHNOLOGY AND THE ACCOUNTING AND AUDITING PROFESSION IN THE MIDDLE EAST

CHAPTER III

THE INTERRELATIONSHIP BETWEEN INFORMATION TECHNOLOGY AND THE ACCOUNTING AND AUDITING PROFESSION IN THE MIDDLE EAST

3.1 Objective

The objective of this chapter is to examine the history and current state of the accounting and the auditing profession and to historically assess what changes the computer technology might bring upon the profession in the Middle East.

3.2 The Current State of the Accounting and Auditing Profession

3.2.1 Introduction

It should be recognised that since the introduction of computer technology into the profession major studies have been undertaken in the West to determine the impact of technology. Some of the most notable ones are listed below:

- A position paper published by the big six accounting firms namely Arthur Anderson, Coopers and Lybrand, Deloitte & Touche, Ernst & Young, KPMG Peat Marwick and Price Waterhouse;
- Information technology and the accountant;
- IT and the future of the audit;
- The chartered accountant in the information age.

According to a survey of accounts and accountants published in June 1994, the accountant's world has changed and changed rapidly. Today's accountant, in addition to having accounting skills and knowledge has to be an entrepreneur, financial analyst, global competitor, market analyst skilled salesperson, good communicator, capable negotiator and public relations specialist, as well as a general manager.(1) According to the International Federation of Accountants (IFAC), the current membership stands at 105 national professional bodies from 78 countries: see Appendix 6 for details.

Though many large and small accounting practices achieved astonishing rates of growth in the 1960s and 1970s, they were rarely viewed as entrepreneurial, aggressive, or unconcerned with their professional status. If anything, the reverse was true: the public accountant was widely seen as solid and staid the very pillar of the reactionary business establishment. This was as much a self assessment as it was the public perception.

What has happened in such a short period of time to alter so radically the way many accounting firms are now trying to project themselves? The answer is 'changing market forces'. Fundamental upheavals in many of the public accountant's traditional marketplaces have brought about an entirely new `accounting as a business' orientation.

The new mood of commercial realism first took root among the larger international firms. Their enormous resources and a wide overview of the important US and UK markets made them realise their over-dependence on auditing.

There is also a growing perception that differences between the big firms are not very significant. And the practice of putting audits up for tender in search of a lower bid is proving increasingly popular with many a corporate management. The successful group marketing of the 'Big Six' concept has, ironically, acted to the detriment of those firms in the eyes of more and more senior financial executives.

To maintain growth in the face of such a frontal assault of their main source of revenue, public accounting firms are throwing huge resources into the cultivation of new markets, new services and, most important of all, new attitudes. The accountants are returning to markets largely neglected during the post-war audit boom. They want to be seen as the premier providers of almost all forms of business advice and, in some cases at least, personal financial planning too. They are starting to concentrate on what can be loosely grouped under the heading of 'financial advisory services'.

But these new markets are peopled with competitors, many of whom are unfettered by the accounting profession's ethical restrictions. Some can buy in good people and avoid the profession's massive training overheads. Others do not have the same inflated staff and salary structures. Furthermore, they do not start off with an image of unimaginative conservatism.

The accountants are running alongside a whole new generation of technology advisers and software specialists, investment and management consultants, lawyers, retail bankers, merchant bankers, stockbrokers, tax experts, and a host of 'non-qualified' accounting advisers. And the competition is widely expected to increase still further with deregulation in the financial services industry. This may permit new entrants to this lucrative advisory market banks, insurance companies, or new forms of 'financial supermarket'.

All this means that the large accounting firms today find themselves playing two very different roles that are becoming increasingly difficult to reconcile. On the one hand, they represent the profession of auditors, acting in the public interest and serving primarily the private and public investor community. For this public role, the accountant has to adopt the highest possible ethical standards, preserve an image of integrity and expose himself to the ever-increasing threat of third party litigation.

On the other hand, the firms operate in the competitive and commercial world in the advisory business. Though the 'professional' image may offer some advantages in terms of reinforcing a reputation for integrity and independence, these advantages are increasingly seen as outweighed by professional restrictions on marketing, publicity and organisational structures.

These two very different roles also present another conflict. As auditors, the accountants are representing the user of financial statements. They are reporting to them upon the representations and stewardship of management. For this role they need to be, and be seen to be, independent of management.

As advisors, the accountants are acting for management. They may be advising on particular accounting systems, computer applications, tax schemes or commercial ventures. They need to be close to management - in its confidence - and to produce the right results in the eyes of management.

Despite the differing demands of the two roles, it seems inconceivable that either one will be abandoned by the larger firms in the foreseeable future. Though there is a widespread drive to reduce dependence on auditing, it remains the major activity of the big firms. Even the most ambitious estimates do not envisage audits contributing less than 30-40 per cent of total fee income in the 1990s.

It is equally impossible for the firms to abandon the advisory field. Without advisory services, there would be little or no growth for the firms. Without interest and a constructive role, the firms would be unable to sustain the interest of their employees or partners. Without high quality staff, reputations would crumble. The firms are thus financially and emotionally committed to the provision of new and more positive services, requiring new skills, a more constructive attitude, and - to the horror of the old school - an aggressive business strategy and style.
Segregation of the two roles may re-emerge as an issue in the years ahead in the Anglo-Saxon countries (it has remained a legally enshrined requirement in France, Belgium and many other countries of continental Europe). And it may have to be adopted - for appearances sake. But it is clear that most of the leading firms continue to perceive a major inter-relationship between their audit and advisory work, using the knowledge gained in the former to more constructive ends in the latter.(2)

According to the position paper by the big six firms "The Public Accounting Profession: Meeting the Needs of a Changing World" published in January 1991, in the United States it was stated that "The public accounting profession is experiencing a subtle yet sweeping transformation, propelled by rapidly changing client, business and public needs, combined with an explosion in technology. These changes mirror developments which are affecting all businesses that complete in the new globol economy.

Many of the changes are caused by a domestic economy that is quickly transforming itself from industrial (in which energy is used to convert raw materials to finished goods) to information based (in which many of the products and services are, or contain, information). The impact of these changes is as profound for auditing as it is for advisory and consulting services.

Providing meaningful information in useful ways has always been an important societal role of the public accounting profession. Since its earliest history, the profession has helped to provide relevant and reliable information and added credibility to such information. Traditionally, public accountants have also assisted managements in evaluating their information systems and controls and provided consulting services to improve their effectiveness. Recent technological developments have served only to intensify the value that the profession can bring to clients and the public in this information age.

New information technology is significantly altering the conduct of audits. In recent years, this technology has permitted businesses to speed up their product-design and production cycles, thus enabling them to respond more quickly to customer demands, improve quality, compete globally and reduce costs. In the process, businesses are merging separate information systems into a single, common corporate data resource.

As part of this system integration, free-standing accounting systems are disappearing, including the traditional accounting journals and ledgers and the usual audit trails. For many businesses, the growing simplicity of computer terminals masks an incredible complexity of underlying computer programs and controls.

These structural system changes are altering the availability of information needed to support an opinion on the reliability of financial statements as well as the means of obtaining that evidence. Not only is the nature of auditing changing, but so are the professional skills required. Computer and information expertise, for example, is becoming much more critical.

Attesting to the credibility of management's assertions has been one of the profession's major responsibilities during its entire history. For years, this service has been epitomized by the annual audited financial statements.

Today, the annual financial statements while still serving a valuable role - are becoming a smaller part of the information needed by management, lenders and stockholders to make informed decisions. Other types of information such as management's discussion and analysis, timely quarterly data, strategic plans, current value information and projections of future performance are becoming more important to management, investors and the public. Likewise, information systems and their related controls are coming under increased scrutiny because of their importance in producing reliable and timely information.

Historically, in attesting to the assertions of management, the profession has added credibility to the historical financial information which is presented to investors and others. As other sources of information become more important, there is a concurrent need to develop ways to similarly assure their accuracy, completeness, neutrality, freedom from bias and credibility.

The challenge - and the opportunity - for the public accounting profession is considerable. Professional standards will need to be developed to cover these possible new services. In addition, the responsibilities that public accountants would assume and the legal exposure they would incur will need to be assessed. Most important, however, there is a clear indication of need, and the profession is well equipped to respond".(3).

Clive Parritt and Baker Tilly wrote an article in the Accountancy Journal on "The Accounting Firm in the New Millennium" which in the view of the researcher appropriately describes the challenges facing the profession in the 21st century. The article states that Information technology has changed the face of accounting over the last 20 years. But next 10 years will surely see an even greater IT explosion, probably with the almost paperless office - even in accountancy firms. More importantly, the services sought from finance professionals will involve interpreting information rather than producing it.

Customer sophistication has increased rapidly in recent years. Expectations will also grow. Clients will expect total efficiency, price competitiveness and a timely quality service. Competition will intensify, and only those who meet clients' perceived needs will survive. In particular, the strains on the increasing number of proprietors of owner-managed businesses will intensify so much that they will seek help from effective business advisers. Firms' ability to interpret management information, advise on business strategy, offer second opinions and comment objectively on business issues will distinguish the successful from the rest. Rewards will be high for those who deliver.

Clients have always sought 'one-stop shopping' through a nominated contact at senior level (account director, service partner). They recognise the need for specialisms but still expect to rely on their usual contact for all advice. The conflict in accounting firms between specialist departments (eg, tax, audit, consulting) and client based services (eg, industry groupings) will need to be resolved. Successful firms in 2001 will deliver services on the basis of client needs rather than departmental hierarchies.

While firms generally will need to be organised in client service groups, opportunities will remain for 'niche' practices. Such niches could be in specialist areas (such as high quality taxation advice or litigation support) or by industrial sector (eg, media, insurance). With the greater sophistication of the marketplace, all firms will have to identify their own unique selling points and develop them.

To meet the needs of the marketplace, the structure of accountancy firms will have changed. There will be fewer junior staff training to be partners and more clerical technicians. Information will be generated so that senior people can spend their time on review, commentary and high -value advice. Regulation and intervention will increase relentlessly - on a worldwide basis. Indeed, auditing may have become a service offered by specialists in separate limited liability companies that will have been hived-off for commercial, rather than regulatory, reasons. Certainly professional indemnity problems will have intensified. Probably at least one major firm will have been destroyed by 2001 - and, at last, legislators will have realised the need to address the concept of joint and several liability in negligence claims.

The IT explosion will have significantly improved the availability of management information to firm leaders. With direct access to information internally and externally (eg, to clients' computers), management procedures will have changed dramatically. Larger clients may have on-line links to firms so that progress can be monitored in real time. This will have a significant effect on the management of audit and accounting assignments and also provide utilisation information on a current basis. Daily time records will be the norm. Information will be input directly into the information database, and billing will be almost automatic.

Management styles are changing already, as people are more and more resistant to authority. By 2001, management will have become even more open. The need for persuasion rather than instruction will be recognised ('sell, not tell'). Management will be questioned more frequently, but his will improve communication and motivation. Leaders will have to be career developers and people 'coaches' rather than just autocratic decision-makers. Management as a function will also get more problematic. Professionals do not like being managed, and motivating them will become more difficult. Mavericks and high-fliers will be especially difficult - harnessing their skills while reducing their disruptive tendencies will become harder because their talents will be easily marketable. The conflicts between regions in multi-location firms will have to be addressed so that local autonomy is encouraged but the benefits of the national unit are not lost.

Succession planning will get tougher by the end of the century. Already there are signs that the pressures on partners and managers (as well as their families), coupled with continuing PI risks, are reducing the attractiveness of partnerships to many. However, this will probably result in a rise in income levels to redress the balance.

Successful firms in the future will need to focus totally on client needs - rather than delivering services in a pre-determined way. Agreed timetables, attractive formats of reports and logical information flow as well as structured advice will be crucial. Managers who do not research (and then address), will watch their firms decline. All firms need to create client conscious people.

Development of the ever-helpful professional must be given priority if we are to replace the existing image of accountants as boring, stuffy, rude and arrogant automatons. The closer partners and firms are to their clients, the more successful they will be - the concept of a firm 'for life' is already prevalent among smaller firms, which foster relationships as the key service providers to families and their businesses. We will all need to copy this approach to stay successful.

The pace of change will increase further between now and the new millennium, and if firms are to face up to the 21st century they will have to embrace change wholeheartedly.(4)

3.2.2 Current Trends in Public Accounting Practice

The drive to reduce dependence on auditing where the market is seen to be stagnating - and this is the case in countries such as the US, Canada, Australia and the United Kingdom - is probably the most noticeable overall trend in today's public accounting business. But there are a number of very distinct developments that illustrate more clearly the new business orientation of the larger firms as follows:

(a) Audit automation

In a further attempt to reduce audit costs, most major firms are urgently researching ways of automating the audit or making more effective use of micro-computer technology despite the heavy expense of developing experimental software, as well as the initial capital investment in hardware that may rapidly become out of date, several United States firms are claiming major - though largely unspecified - breakthroughs in this area.

Obvious areas for computer use include data-banks for statistical comparative purposes, sample selection, interrogation of client computers, automatic schedule preparation, and remote access to client data via terminals based in the auditor's office.

(b) Smaller business

The audit market in relation to larger companies is widely seen as being stagnant. This has led most major firms to search for smaller, hopefully fast-growing, audit clients.

The leading firms began by heavily promoting their big firm image and had extensive success in many countries - at the expense of the smaller and medium-sized competitors. The smaller firms grew progressively more resentful and tried to fight back, emphasizing their 'personal service' and cost effectiveness. Now the big firms are turning the screws by suggesting that they too can offer a 'personal service'. Given their immense resources, it seems a battle they are bound to win. Hence, many commentators doubt the long term viability of anything other than the biggest and smallest firms.

(c) Ethical deregulation

The need to compete with 'non-professionals' in the market for advisory services has resulted in growing pressure, mostly but not exclusively from the larger firms, for the lifting of traditional professional restrictions on advertising and publicity. To date, the Americans have been successful in removing the ban. At the time of writing, the Australians look certain to follow, as do the British and Irish, despite differences between the six accountancy institutes.

An interim approach has been adopted in other countries such as New Zealand where advertising by the profession as a whole has been orchestrated by the local institute.

For the most part, continental European countries have not sought to follow suit. This can be attributed to their greater preoccupation with the new EEC-initiated audit work and to the more deeply entrenched legal restrictions on professional conduct.

(d) Industry specialisation

Industry specialisation is now seen as an important marketing tool that most firms have been attempting to exploit. Traditional divisions along functional lines (audit/tax/ management advisory services and so on) are increasingly evaporating as firms seek to pool all knowledge of an industry in one group. It is all part of the new 'understand your client' approach. Industry specialisation is also seen as a possible survival strategy for the smaller firms.

1993 fee income split as reported in the Accountancy Journal, July, 1994 Edition indicated that one firm has been quite successful in this area, obtaining up to 45% of its fees in consultancy in various industries - in UK, and worldwide. (See tables 1.19 & 1.20)

(e) The audit springboard

Perhaps the most dangerous trend of all is the suggestion that the audit could become a 'loss leader' operation, merely providing an entre to an industry or company that can then be plied with more profitable advisory services. Though no major firm would dream of admitting to such a possibility, several instances of tendering around the world have raised major questions as to the firms' motives when making their pitch.

The notion cannot make sense in financial terms, as long as auditing continues to account for such a high proportion of the big firm's activities. But as a selective practice, it does appear to be catching on for short-term benefit. The long-term consequences of this approach, were it to become widespread, would patently be disastrous for the firms - and not too healthy for the users of accounts.

3.3 Automating the External and Internal Audit Function

3.3.1 The Role of Automated Audit Tools

Tools are used for two purposes in auditing: (1) Tools are needed to accomplish audit objectives. For example, it would be almost impossible for a person to assess the adequacy of internal controls without a questionnaire of some type to use as a guide or reference. (2) Tools and related techniques are used to increase the productivity of the individual auditor and audit team. For example, matching the records in two files could be a very time-consuming function if performed manually. The use of generalized audit software speeds this task significantly. Similarly, preparing and running multiple audit software applications to test numerous attributes and controls in a large system can be time-consuming. Preparing an integrated test facility or using other types of computer software testing tools to accomplish the same objectives may also be time-consuming, but might be more efficient over a long period of time.

Automated audit tools generally fall into three categories: (1) microcomputer-based, (2) mainframe computer based, and (3) terminal based. Although some automated tools can be costly and require extensive training, auditors can often use the basic functions of many of the automated tools, auditors can, with experience, utilize some of the more sophisticated automated audit techniques such as statistical analysis and parallel simulation or prototyping. See figure 3.1 for details of audit tools and techniques.

In contrast, some automated tools, such as integrated test facilities and sophisticated customized computer programs for audit use, require extensive investments of time and technical resources. However, as the sophistication of business systems increases, the manual alternatives to these audit investments become less feasible if appropriate audit scope and objectives are to be accomplished.

The dilemma facing auditors is that, while they continue to perform much of their work manually, their organizations will continue to become more computerized. The opportunity to use effective automated tools exists, but many auditors are reluctant to automate auditing practice. The reluctance is due both to a lack of knowledge and skills and to the cost of available tools.(5) In the researcher's view that smaller firms in the Middle East may find it difficult to use automated tools in audit beleave of the reasons mentioned above, however there is strong evidence to suggest that big six firms in the Middle East are acquiring and using automated audit tools.

Figure 3.1: Summary of Audit Tools and Techniques

Tools	**Audit Techniques**
Manual Tools Audit programs, Questionnaires, Checklists	Directing audit procedures such as scope of inquiries and interviews, observations and examination of documentation
Manual Flowcharts	Control analysis Reviewing program logic
Automated Tools	
Word Processing	Audit program preparation Internal control checklist preparation
Graphics Packages	Data analysis display Reporting results
Spreadsheets	Data analysis
Flowchart Software	Analytic flowcharting Transaction flow analysis Control analysis

Tools	Audit Techniques
Generalized Audit Software	Data analysis Edit and reasonableness tests Comparison of files or files with physical evidence Parallel simulation Date integrity analysis Confirmation production Verify processing
Custom Computer Audit Programs	Same as generalized audit software, but limited in purpose
Integrated Test Facility	Verify processing

To further understand the role of the audit function in an EDP environment, it is first necessary to understand management's EDP concern. A survey published in December 1991 by the Institute of Internal Auditors, Inc in (6) indicates that key observations related to the survey results in this area include the following:

- Nearly all of the respondent organisations indicated some level of use of information technology tools and techniques in the audit process. Figure 3.2 lists the techniques in the rank order of use and presents the percentage of respondents who indicated that they use the tools.
- Microcomputer tools and techniques are widely used within the internal audit organisations surveyed.
- Test decks, embedded audit modules, and integrated test facilities (ITF) are not widely employed.
- Audit tools resulting from emerging or recent technologies (e.g., knowledge-based systems and Computer-Aided Software Engineering o CASE) have not gained widespread use.
- The widespread use of information technology in auditing has resulted in significant improvements in audit productivity, quality, and management.

Perceived benefits of information technology, as reported by the 253 respondents, are summarised in figure 3.3 costs associated with the use of information technology (35%) and time constraints on its acquisition and use (26%) were most frequently cited as the primary reasons why information technology is not more widely used.

Figure 3.2: Use of Information Technology Tools/Techniques in Auditing

Tool/technique	Percentage of respondents indicating use
Spreadsheet and word processing	97%
Information retrieval software	74%
Flowcharting tools	73%
Downloading from mainframe to microcomputer	66%
Microcomputer database software	66%
Generalised audit software	65%
Systems level utilities	47%
Access control software tools	47%
On-line editors/tools	42%
Specialised audit software	40%
Risk assessment software	38%
Electronic or automated workpapers	36%
Test decks	22%
Embedded audit modules	11%
Integrated test facilities (ITF)	11%
Optical scanning	10%
Decision support/knowledge-based systems	9%
Computer-aided software engineering tools	3%

Figure 3.3: Percentage of Respondents Who Reported the Benefit of Information Technology as One of the Three Most Important Benefits

Benefit	Percentage
Improved efficiency	56%
Increased analysis capability	53%
Improved effectiveness	49%
Improved audit quality	47%
Ability to evaluate a larger universe	43%
Ability to audit more areas/functions	15%
Integration of financial/IS audit skills	14%
Reusability/extendibility of techniques	12%
Consistent application of audit procedures	10%

The use of information technology is a necessity for today's auditor. There are many tools and techniques available to support the management, planning, execution, and reporting processes. An individual computerised tool or technique can be used to support more than one step in the audit process. Accordingly, the auditor should consider information technology as a tool box and implement procedures to ensure use of the proper tool for the job and replenishment of the tool set as needs and information technology change. Figure 3.4 illustrate this concept.

Figure 3.4: Auditor's Tool Box

Managing the Audit Function	Planning the Audit	Conducting the Audit	Reporting the Audit
- Risk assessment and scheduling software	- Audit software	- Audit software	- Spreadsheets
- Computer-based training	- On-line inquiry	- Report writers	- Automated work-paper software
- Word processing	- Spreadsheets	- On-line inquiry	- Desktop publishing
- Telecommunications	- Word processing	- Spreadsheets	- Word processing
	- Telecommunications	- Word processing	- Telecommunications
	- Project management	- Telecommunications	- Text retrieval
	- Software	- Text retrieval	- Graphics
	- Text retrieval	- Graphics	- Database manage-ment software
	- Graphics	- Integrated test	
	- Flowcharting	- Flowcharting	

3.3.2 Auditing with Computer

3.3.2.1 Introduction

Different types of audits and the purposes of audits have evolved over many years, and this evolution is still taking place. Accordingly, auditing should be defined broadly enough to cover the various types and purposes of audits. The definition of auditing that appeared in a statement of basic auditing concepts, published in 1973 by the American Accounting Association (AAA) on Basic Auditing Concepts, embraces both the process and purposes of auditing as follows:
"Auditing is a systematic process of objectivity obtaining and evaluating evidence regarding assertions about economic actions and events to ascertain the degree of correspondence between those assertions and established criteria and communicating the results to interested parties" (7).

The methods of processing accounting data have changed in three areas: hardware, software and location. Hardware changes include moving from manual to EDP systems, changes from first-to second- and third and fourth-generation computer systems, the development of teleprocessing and real-time systems, and minicomputers and microcomputers. Software changes include the development of numerous languages, applications, operating systems, and data-base management systems prototyping. Location changes include moving the responsibility for and physical site of computers outside the accounting department.

The 1980's saw for the first time the emergence of practical expert systems for business both the commercially available variety and those custom-designed by larger business organisations.

The objectives of artificial intelligence (AI) are analogous to but somewhat broader than the objectives of expert systems specifically, AI seeks to:

- Better understand the rules of logic and cognitive psychology that are the basis of the processes of human reasoning and problem solving;
- Utilise this better understanding to identify opportunities where computer technology can be used to simulate or substitute for human intelligence; and
- Develop systems that perform at a level normally associated with human intelligence.

Whereas the objective of an expert system is essentially to act as a substitute for a human expert. It follows that the ideal expert system like a human expert, should be *able to:*

- Identify the problem, when necessary interacting with the people affected;
- Analyse the problem, getting help from other sources if needed;
- Solve the problem;
- Explain how it derived the solution;
- Help implement the solution; and
- Learn from the experience.

Clearly, no expert system can meet all of the above objectives, and therefore the ideal system does not exist.(8) However, the technology in 1990's is moving in that direction, and even today in 1995, those systems can be helpful for maintaining and running certain types of applications.

Major international accounting firms have vested interest in the development of expert systems in the view of the researcher because to a greater degree audit involves judgements by the expert that are not so easily codified into an expert system's knowledge base. Nevertheless, auditing is an area for which expert systems can be envisaged,(9) for example, to:

- Evaluate internal controls - including computer controls in an accounting system
- Assess an allowance for bad debts; or
- Perform statistical sampling for purposes of audit testing, and/or design statistical systems.

Changes in the hardware, software and location of computers have been accompanied by changes in conceptual approaches to auditing. The first approach of auditing around the computer has been followed by auditing with the computer and auditing through the computer.

The auditors' skill level has had to rise with the increasing sophistication of computers. A dilemma has been whether to train auditors as EDP technicians, or vice versa. The profession's response has been to require that auditors meet specific levels of skill. This is in contrast to other audit areas that rely on such specialists as actuaries, engineers, and geologists.

In addition to specifying level, the profession has issued standards to be met in understanding the control structure within which computers operate. This control structure included user controls and EDP controls. In examining EDP controls, the auditor should evaluate general controls and application controls.(10)

Paralleling the rapid growth of computer processing in business and government has been the growth of computer-assisted auditing. Not only can computers automate the recording, calculating, summarising and reporting steps involved in accounting; but also they can automate many of the processes by which the auditor checks the functioning and results of the accounting system. The use of the computer to automate certain audit functions is known as computer assisted auditing.

3.3.2.2 Changes in Auditing Methods and Skills Requirements

Changes in hardware, software and location have changed the conceptual approach to auditing. An early approach consisted of essentially ignoring the computer, treating it as a black box, and auditing around it. The increasing sophistication of computers and auditors, however, has since led to computers being used in two ways: (1) as a tool of the auditor aiding in the performance of the audit, such as printing confirmation requests, and (2) as the target of the audit where data are submitted to the computer and the results are analysed for processing reliability and integrity of the computer program. The auditor approached the use of computers in a number of ways as follows:

(a) Auditing around the Computer

(b) Auditing with the Computer

(c) Auditing through the Computer

and had to acquire the skills to use them effectively in his/her audits.

3.3.2.3 Auditing Skills Requirements

The increasing sophistication of computers and the demands placed on the auditor to audit them have led to an auditing skill dilemma. Should the computer auditor be required to have a knowledge of computer concepts and processing? Should the computer auditor rely on the skills of an EDP technician as a specialist, just as auditors rely on the skills of actuaries, engineers, and geologists elsewhere? The auditing profession in the United States initially resolved this dilemma by issuing a standard for auditors, SAS No. 3, which specified the level of knowledge required of an EDP auditor. This standard required that the auditor acquire the knowledge. Reliance was not to be placed on specialists, as done elsewhere in the audit.

The initial standard was followed by two others which superseded it and modified and the philosophy upon which it was based. This modification was accomplished by SAS No. 43, which changed the focus of EDP controls evaluation by requiring that such evaluation be an integral part of the audit rather than addressed as a separate component.

This change in focus was reinforced by SAS No. 55, which incorporate EDP issues throughout a discussion of the internal control structure. These two standards continue the demand placed on the auditor by SAS No. 3 - the auditor must have the requisite knowledge to understand the EDP system and not rely on specialists.

The auditor should also be familiar with sources of information on audit tools and technology including:

1 *CPA and CA firms.* Many public accounting firms have developed various sophisticated audit tools and techniques for their own internal staffs, including audit programs and internal control questionnaires, generalised audit software, risk analysis systems, workpaper and trial balance packages, and the like. In the past, most firms previously considered these to be proprietary products and did not release them to the public; today you can find them advertised in internal audit and other accounting firms what tools and techniques the firm has that could be made available to the internal auditors.

2 *Accounting and auditing associations.* Most professional associations in the auditing profession (for example, the American Institute of Certified Public Accountants, The Institute of Internal Auditors, the EDP Auditors Association, and the Canadian Institute of Chartered Accountants) offer various tools for their membership. The tools include audit guides, checklists, audit programs, and software for auditing. Many provide classroom instruction and conferences explaining the use of various audit tools and techniques.

3 *Vendors of audit tools.* Many independent profit-making organizations provide mainframe and microcomputer-based tools for auditors. Availability of the products is usually announced through advertising and reviews in the professional newsletters and magazines of the auditing associations.

4 *Governmental agencies.* Auditing departments in government agencies frequently make their audit tools available to interested parties. For example, the US. General Accounting Office makes available many of its internal publications, checklists, and audit programs.

5 *National audit conferences and trade shows.* Many auditing associations conduct national conferences and trade shows which allow vendors to display audit tools. Attendees can discuss the tools and, in many instances, examine them or observe their execution. Newer audit tools, in particular, tend to be exhibited at national conferences.

Auditors trained as EDP technicians, EDP technicians trained as auditors, and teams combining the skills of both need a basic set of skills or conceptual foundation. These skills include auditing concepts and EDP concepts.

Auditing concepts that the computer auditor must understand include an appreciation of the basic objectives of the audit-and assessment of control risk and the collection of evidence to form a basis for an opinion. To accomplish these objectives, the computer auditor performs tests of controls and substantive testing.

The computer auditor must also understand such EDP concepts as the following:

1 systems concepts, which include the types of hardware and software used, the names and functions of personnel who operate computer systems, and the procedures used in such operations.

2 file structures and organisation concepts, which include the ways in which data can be organised and stored on and retrieved from a computer system; and

3 techniques for depicting the flow of data through a computer system, which include systems and program flowcharts and decision tables.(11)

In any discussion of the education and training of future professional accountants, consideration must be given to the implications for the profession of the accelerating developments in the area of information technology (IT).

Technologically speaking, the world is far more multipolar today than in earlier decades. The major developed countries today possess the technological capability necessary to achieve significant breakthroughs in various aspects of managing organisations. There is much evidence to suggest that product cycles are shortening and that, in modern organisations, the strategic management cycle is undergoing rapid transformation.

Developments in technology mean changes in the external as well as internal environment of the profession; the faster these come, the swifter the impact on the education process and the shorter the reaction and response time. Such developments prescribe a new approach to professional accounting education and training. This will require that the latest tools and techniques of high technology be integrated into the professional pre qualification education, training and life-time learning of the future accountant. Because of this, it is important that, in all consideration of the education of the accountant, care is taken to ensure adequate treatment of the IT dimension of each subject.(12)

3.3.2.4 Automating the Internal Audit Function

The professional practice of auditing has been in continuing state of change and evolution since its inception in the early twentieth century. This evolution has been marked by constant challenges for the audit profession posed by economic, governmental and technological developments. Meeting these challenges among other things, led to the establishment of three distinct branches of auditing: Governmental, External and Internal. Internal Auditors have met the challenges in ways that have brought the practice from obscurity to a position of prominence in modern business enterprises. (13)

3.3.2.5 The Internal Auditor's Role

Internal Auditing by definition is an independent appraisal function established within an organisation to examine and evaluate its activities as a service to the organisation in this effective discharge of their responsibilities. To this end, Internal auditing furnishes them with analyses, Appraisals, Recommendations, Counsel and Information concerning the activities reviewed. (14).

Computer operations, within an organisation represents one of the most important areas of professional activities that supports the total management effort. It has assumed a central role in the total spectrum of managerial and internal auditing practice. The Internal Auditor would be involved in assessing the impact of such diverse technology on his/her work. He/she would be interested in justification for type of equipment and applications in his/her organisation, Lease versus Buy considerations, design and planning, security, utilisation and billing rates control over input, processing and output, logistics and housekeeping, reports generated, and effectiveness of system in meeting needs. (15)

The internal auditor must recognise the impact that computer have had on all parts of the control process in his/her organisation particularly dealing with:

(a) Better Availability of Information

An important contribution that computers make to the control process is in providing more complete information at all stages of the control process. This has a number of important features - more complete information, better analysis and dissemination of that information, and availability on a more timely basis. In all cases a better basis for effective control action can thus be provided.

(b) Programmed Controls

The computer has a special capability to program the handling of sequences of transactions and operations so that they can be executed in a prescribed manner. It is also possible to build into those programs various types of controls. Thus to a considerable extent the objectives of control can be accomplished in a planned manner, and with intervention by individuals only in accordance with previously established rules and criteria. Control objectives are thus again more efficiently achieved.

(c) Direct-Access Capability Dangers

A particular capability of computer is that they can establish memory banks of operational data which can be tapped by available technical means. In many respects this provides greater assistance to all persons charged with control responsibilities. It does, however, pose some special problems. These problems are that higher level supervisors can have access to operational data relating to lower organisational levels before data flow up to them in accordance with the regular system. This availability does not necessarily mean that the data should be or will be utilised in violation of normal organisational sequences, but it does provide a new possibility that it can and might be done. These possibilities can have a significant impact on the total control system and need to be covered carefully.

(d) Types of Risks

The use of EDP by its very nature involves a concentration of data and processing that, on the one hand, eliminates segregation of duties and related safeguards that are part of manually operated systems. This concentration then brings with it increased security risks pertaining both to improper entry of data and the later protection of it from physical loss. These risks in part pertain to individual programs and need to be dealt with through individual application controls. Other risks pertain to the facilities as a whole and to all applications.

(e) Built-In Controls

A final aspect of the control problem generated by EDP usage is that needed system controls should to a major extent to be built into the system during the design and development stage. If this is not done, it may be too costly or even impossible in any reasonable sense to remedy the deficiencies. The unique nature of this problem indeed poses special problems to internal auditors who typically review operational developments on an "after-the-fact" basis. (16)

These changes in organisational activities particularly changes in data processing have caused changes in the traditional role of the internal auditor. To understand this changing role, one must understand the changes occurring in internal control that are being brought about by increasing automation and new data processing technology.

In addition, audit and control must be considered together rather than separately, because they are completely interrelated. Internal controls in the data processing environment govern transaction processing, record keeping, reporting and environmental security; internal audit is the evaluation and verification of these controls and the results of data processing. Thus, internal controls and the records and reports produced by data processing are the objects of internal audit. Because of this interrelationship, one cannot consider internal audit without considering internal control (17).

3.4 Computer Control Guidelines

3.4.1 Audit Responsibilities

The auditor's responsibilities with respect to internal control over EDP systems remains the same as with manual systems, that is, to obtain an understanding adequate (1) to aid in planning the remainder of the audit and (2) to assess control risk. Yet, factors such as the following may affect the study of internal control in that computer systems may:

1 result in transaction trails that exist for a short period of time or only in computer readable form

2 include program errors that cause uniform mishandling of transactions - clerical errors become less frequent

3 include computer controls that need to be relied upon instead of segregation of functions

4 involve increased difficulty in detecting unauthorised access

5 allow increased management supervisory potential resulting for more timely reports

6 include less documentation of initiation and execution of transactions

7 include computer controls that affect the effectiveness of manual control procedures that use computer output.

The overall process used to consider internal control is the same vs. manual systems in that auditors must obtain an overall understanding the control structure. The AICPA Audit Guide, The Auditor's Study and Evaluation of Internal Control in EDP Systems, points out that computer controls may be divided between general and application controls. These controls are an integral part of the internal control structure and these auditor must obtain an understanding of them to perform the audit.

Following the consideration on internal control, the auditor perform various substantive tests necessary to evaluate the reasonableness of records produced by the EDP system. The nature, timing, and extent of tests, like all other tests, depends upon the auditor's assessment of control risk.(18)

3.4.2 General Control Procedures

There are seven categories of general control procedures:

- Implementation control procedures are designed to ensure that programmed procedures for new systems of major enhancements to existing systems are effectively designed and implemented.
- File conversion control procedures are designed to ensure that when a significant new system is introduced or an existing system is modified, the conversion process does not give rise to data file errors.
- Maintenance control procedures are designed to ensure that changes to programmed procedures are effectively designed and implemented.
- Computer operations control procedures are designed to ensure the continuity of processing (that is, that the correct data files are used and recovery procedures are provided) and the consistent application of programmed procedures.
- Data file security control procedures are designed to prevent or detect unauthorised changes to stored data or the initiation of unauthorised transactions.
- Program security control procedures are designed to prevent or detect unauthorised amendments to programs.
- System software control procedures are designed to ensure that system software is effectively implemented, maintained, and protected from unauthorised changes.

The first four categories are necessary for the effective operation of programmed control procedures. The next two categories ensure that only properly approved changes are made to stored data and to programs. The last category relates to system functions and, therefore, can affect both programmed procedures and data files. System software procedures are particularly important because of their impact on the effectiveness of other control procedures. For example, the password verification procedures that permit access to data files are usually incorporated into system software (19).

3.4.3 The Effect of Microcomputers on the Accounting System and Related Internal Controls

The effect of microcomputers on the accounting system and the associated risks will generally depend on:

- the extend to which the microcomputer is being used to process accounting applications;
- the type and significance of financial transactions being processed; and
- the nature of files and programs utilized in the applications.

3.4.4 The Effect of a Microcomputer Environment on Audit Procedures

In a microcomputer environment, it may not be practicable or cost-effective for management to implement sufficient controls to reduce the risks of undetected errors to a minimum level. Thus, the auditor may often assume that control risk is high in such systems.

In this situation, the auditor may find it more cost-effective, after obtaining an understanding of the control environment and flow of transactions, not to make a review of general EDP controls or EDP application controls, but to concentrate the audit efforts on substantive tests at or near the end of the year. This may entail more physical examination and confirmation of assets, more tests of details, larger sample sizes and greater use of computer-assisted audit techniques, where appropriate.

Computer-assisted audit techniques may include the use of client software (database, electronic spreadsheet or utility software), which has been subjected to review by the auditor, or the use of the auditor's own software programs. Such software may be used by the auditor, for example, to add transactions or balances, to select accounts or transactions for detail testing or confirmation or to examine databases for unusual items.

In certain circumstances, however, the auditor may decide to take a different approach. These circumstances may include microcomputer systems tat process a large number of transactions when it would be cost-effective to perform audit work on the data at a preliminary date. For example, an entity processing a large number of sales transactions on a stand-alone microcomputer may establish control procedures which reduce control risk; the auditor may decide, on the basis of a preliminary review of controls, to develop an audit approach which includes testing of those controls on which he intends to rely.

The following are examples of control procedures that an auditor may consider when he intends to rely on internal accounting controls related to stand-alone microcomputers:

a) Segregation of duties and balancing controls:

- Segregation of functions
- Rotation of duties among employees
- Reconciliation of system balances to general ledger control accounts
- Periodic review by management of the processing schedule and reports which identify individuals that used the system

b) Access to the microcomputer and its files:

- Placement of the microcomputer within sight of the individual responsible for controlling access to it.
- The use of key locks on the computer and terminals.
- The use of passwords for access to the microcomputer's programs and data files.
- Restriction on the use of utility programs.

c) Use of third-party software:

- Review of application software prior to purchasing, including functions, capacity and controls.
- Adequate testing of the software and the modifications to it prior to use.
- Ongoing assessment of adequacy of the software to meet user requirements.(20)

3.5 Local Area Networks

Local Area Networks (LANs) combine telecommunications and computer technologies, and while auditors are familiar with computer technology, they usually are less familiar with telecommunication technology. To effectively audit such complex systems, auditors must understand the basic concepts of LAN's. The objective of a LAN audit is the same as that of any other audit: To ensure that input, processing, and output controls are functioning as designed and intended; however the method for achieving that objective requires sophisticated specialised knowledge and skills.

Lan's have created a new doman of networks that can be designed, installed, and managed by user groups without the assistance of a commom carrier. The audit focus in this area is on the presence of formal network management policies and procedures, and an adequate segregation of responsibilities.(21)

Certain aspects of LAN technology according to the author are of special significance to auditors, many have been associated with particular problems or vulnerabilities. These aspects are described below:

(a) The seven open system interconnection (OSI) layers. The OSI identifies seven functional layers: Applications, presentation, session transport, data link and physical. Basically these layers describe how data is communicated between applications or users.

(b) Topologies: Each of the three topologies is vulnerable in different ways.

(c) Communication media: Physical tapping of fiber-optic cable is almost impossible because of the speed and the non-radiating method of transmission.

(d) Base-band versus broad-band because it uses more complex message signalling, a broad-band transmission is harder to intercept than a base-band one.

(e) Physical media protection: Cables are usually installed in one of three ways: through a wall, over a ceiling, or under a carpet.

Although every audit should be treated as a unique situation, basically, the audit program can be divided into two major areas, general and application controls, with application controls further divided into input, processing, and output controls. (22)

3.6 Conclusion

Information technology continues to change and evolve as new capabilities emerge to satisfy the information requirements of organizations. With these new capabilities come new risks and the need for corresponding controls that are understood by management and evaluated by auditors.(23)

The specific technology trends causing changes in control and audit considerations are discussed in Figure 3.5 presents a brief discussion of a selected number of these trends, with an indication of some of the control and audit implications.

Figure 3.5: Specific Technology Trends and Their Risk, Control, and Audit Implications

Technology	Trends	Risk, Control, and Audit Impact
Computer-Aided Software Engineering (CASE) - The automation of structured systems development	• Availability of greater functionality across the entire systems development life cycle in easy-to-use and powerful tools	• Uncoordinated tools used to develop applications, which may result in faulty and costly designs • Opportunity to implement systems development controls and audit tools
Application Programming Languages and Systems	• More powerful, easier-to-use languages, with which end users can generate their own applications	• Lack of proper controls in systems • Uncontrolled and potentially costly development by end users • Systems that are difficult to audit • Opportunity to use these tools in application development and internal audit
Telecommunications Networks	• Business reliance on telecommunications • Availability of local area networks (LANs) to support complex applications on a departmental basis • Networking of LANs and other networks to link microcomputers to mainframes	• Spread of viruses • Unauthorized access • Lack of control and auditability in departmental computing and LANs • Internterprise exposures associated with applications that use electronic data interchange • Improved user and auditor access to systems and data

Technology	Trends	Risk, Control, and Audit Impact
Operating Systems	• More powerful and easy-to-use systems • Operating systems that can be used on different computers • Less distinction between operating systems and application	• Incompatibility o software across operating systems • Loss of data integrity during the exchange of data across operating systems • Opportunity to migrate controls to the general operating system environment • Availability of tools for users and auditors
Knowledge-based Systems The use of rules and inference in application systems	• Integration of knowledge-based systems with other technology • Availability of easy-to-use tools for building applications	• Over-reliance on the system • Decisions made based on inaccurate, inconsistent, or outdated information • Opportunity to use knowledge-based systems in user and audit applications
Image Processing	• Integration of image processing with other technologies • Integration of image processing into applications and development tools • Lower cost of storage devices	• Image processing applications that are not coordinated with mainstream processing • Opportunity for improved access to and auditability of information
Database Management System (DBMS) - A hardware/software system that organizes, accesses, and stores data	• The emergence and acceptance of more advanced DBMSs • The availability of distributed database management	• Unauthorized access/update to database due to data sharing or the lack of coordinated controls • Reduced service levels due to sharing • Opportunity to implement controls in the DBMS (e.g. security)

Technology	Trends	Risk, Control, and Audit Impact
Applications Packaging	• Greater availability and acceptance of precoded applications package	• Systems that do not meet business or user needs • Failure to implement appropriate controls due to lack o knowledge or vendor constraints • Reduced auditability due to packaging or unavailability of source code • Opportunity for improved auditability due to system features

3.7 Research Hypotheses

3.7.1 Introduction

The intent of this research is to expand our insight into the impact of computer technology on the accounting and auditing profession in the Middle East.

The research questionnaires were developed in four parts to critically analyse the impact of computer technology as driven by hardware and software users, audit firms operating in the Middle East, colleges and universities, computer hardware and software suppliers. the inter-relationship in the four parts to the research are clearly stated with a common denominator "Computer Technology" and the linkage between the providers of the technology and those use it.

Topics dealing with the impact of technology were considered with a view to answering the following:

(a) Access to computer technology. The term refers to hardware, software and the expertise required to runt it.

(b) Availability of application software, customised, Arabised to suit the Middle East environment.

(c) The availability of professional advice on computerisation including preparation of detailed analysis of the information requirements to the firm and individual decision makers.

(d) End-users involvement in the systems development process;

(e) End-user computer literacy.

(f) Special training and computer education programs to familiarise the end users with their application software and hardware.

(g) Choice of accounting and management information systems softwares language of software and methodology to acquiring.

(h) Is there a true transfer of technology or merely a transient technology particularly in the absence of qualified and experienced locals to run it and the overwhelming majority of expatriate workers in the information technology positions.

3.7.2 Experimental Investigation Relating to Computer Hardware and Software Users

The first structured questionnaire (see Appendix 1) was used to collect information regarding the computer technology user environment particularly those dealing with:

(a) the size, type and population mix of the firm (users) expatriates, locals.

(b) application systems quantity, quality, problems and bilingualism.

(c) computer hardware specification, size, number and units.

(d) application software type, way of acquiring language used.

(e) training, type, source and possible contribution made by auditors and supplier of information technology.

3.7.3 Experimental Investigation Relating to the Auditing Profession

The second structured questionnaire (see Appendix 2) was used to investigate the impact of technology contribution made by the profession. Questions were written to gather information on the type of organisation, the scope of the activities, the level of computer literacy and training required to its staff and clients personnel, the type of applications used and the advice given to clients on computerisation.

3.7.4 Experimental Investigation Relating to Colleges and Universities

The third structured survey (see Appendix 3) deals with the educational institutions and their contribution to the introduction of computer technology particularly those dealing with:

(a) computer related policy dealing with the computer utilisation, introduction and acquisition.

(b) scope of computer educational coverages and level of support from government and faculty members.

(c) instructors computer literacy and use of technology.

3.7.5 Experimental Investigation Relating to Computer Hardware and Software Suppliers

The fourth structured survey (see Appendix 4) address the computer hardware and software suppliers who in the view of the researcher are the providers of computer technology and much of the influence in the region is emanating from them. The research questionnaire discusses:

(a) the type of organisation size, staff mix, type of hardware and language of operation.

(b) scope of activities including type of computers provided;

(c) the type of application software and language of operation.

(d) user training and the various types of training modules.

3.7.6 Experimental Hypotheses

The dimensions in the experimental research together with the interrelationships can best be described in a matrix as follows:

Dimension		Computer hardware and software users	Auditing profession	Colleges and universities	Computer hardware and software suppliers
1	General information about the organisation	x	x	x	x
2	Application systems users	x			
3	Computer hardware	x			
4	Application software	x			x
5	Training	x	x	x	x
6	Scope of activities		x	x	x
7	Computer related policies			x	
8	Options for education in computer technology			x	
	No. of questions	45	20	30	40

The interrelationships amongst the various dimensions were based on perceived expectations that they do exist and some of the hypotheses and propositions postulated in this research are stated in the positive form whilst others are in a null form. The experimental hypothesis relating to each of the above eight dimensions are further broken down into manageable hypotheses relating to people, software and training and transfer of technology to the region in the Gulf.

3.7.7 Formulation of Hypotheses

In formulating key hypotheses the following issues which are relevant to the Gulf Region specifically and to this Middle East in general have emerged:

(a) Arabisation which breaks down into two distinct areas:

The lack of Arabised software and

shortage of skilled locals to develop Arabic software

(b) Skills transfer and the level of skilled expatriates users of the technology. This is again directly related to the language of software issue and training.

(c) Training in computer technology and the level of training provided by the Multinational Companies and Local Universities and Colleges.

(d) Size of the firm and usage and type of computer technology by this population in the Gulf.

Therefore, the researcher has been selective in formulating this hypotheses as shown in the remainder of this chapter.

3.7.7.1 Hypotheses Relating to Arabisation

H_1 There is a negative impact on the development of Professional Arab Nationals on the use of computer technology resulting from the use of English as a main and a second language of administration.

H_2 True transfer of technology can only be achieved when the people who acquire the technology can use in their own language therefore, there is a strong relationship between the language of the operating and application systems and true transfer of technology.

H_3 There is a relationship between the availability of technically skilled Professional Arab Nationals and the recruitment of Non-Arab expatriates to run most of the activities connected with computer hardware, software and reporting.

3.7.7.2 Hypotheses Relating to Transfer of Technology

H_4 There is a negative impact on the development and growth of Professional Arab Nationals resulting from the recruitment and use of Non-Arabs in the workplace on jobs dealing with computerisation and accounting.

H_5 There is a negative impact on the true transfer of computer technology resulting from lack of statement of direction.

H_6 There is a relationship between the acquisition of hardware, software skills required and consultancy and the need to develop the Arab National skills to use them.

3.7.7.3 Hypotheses Relating to Computer Training

H_7 There is a strong relationship between the acquisition of external training or internal development of training in computer and information technology and the development of Arab human resources on the use of technology.

H_8 There is a strong relationship between the level of training and introduction of computer technology and the support of the business community and educational institutions.

REFERENCES

CHAPTER III

1 International Federation of Accountants (IFAC) "2000 and beyond - A Strategic Framework For Prequalification Education for the Accountancy Profession in the Year 2000 and Beyond" discussion paper, , June 1994. pp 1-2

2 Cairns D., Lafferty M., Mantle P., "Survey of Accounts And Accountants 1983-84" Lafferty Publications Limited PP 190 - 192.

3 Aruthur Anderson & Co.; Coopers & Lybrand.; Deloitte & Touche.; Ernst & Young; KPMG; Peat Marwick; Price Waterhouse.; "The Public Accounting Profession: Meeting the Needs of a Changing World" position paper, USA, January 1991. pp 27-27

4 Parritt C. and Tilly B., "The Accounting Firm in the Milleunnium: The Accountancy; March 1994. pp 83

5 IFAC Handbook 1994 "Technical Pronouncements". EDP environments - standalone microcomputers.' pp 316 - 320

6 The Institute of Internal Auditors Research Foundations "System Auditability and Control" December 1991, pp 2 - 2 to 2 - 3

7 O'Reilly V.M, Hirslh B.M., Defliese P.L., Jaenicke H.R., "Montgomerys' Auditing" Eleventh Edition, John Wiley & Sons 1990. p 5.

8 Walsh A.M., "The Handbook of Information Technoloy" Richard DE BOO pulishers. 1991, pp 11 - 5 to 11 - 6

9 IBID, pp 11 - 10 to 11 - 11

10 Watne D., and Turney P.B.,"Auditing EDP Systems" second edition prentice hall, 1990 pp 18.

11 Watne. IBID pp 14 - 17

12 IFAC, IBID. pp 5

13 Wilson J.D., Root S.J., "Internal Auditing Manual" Warren, Gorham & Lamont, 1984 Part I, P2

14 The Institute of Internal Auditors "Revised Statement of Responsibilities of Internal Auditing" The Internal Auditor, August 1990.

15 Brink V Z, and Witt H., "Modern Internal Auditing" "Appraising operations and Controls" John Wiley & Sons, Fourth Edition, 1982, P.599

REFERENCES

16 IBID Op.Cit PP 99-100

17 SAC, IBID pp 3 - 4 to 3 - 6

18 Perry, W.E and Davies K.W "Handbook for Internal Auditors, Mathew Bender, release number 13, August 1994, pp 22-15 to 22-18

19 O'Reilly. Op-Cit. pp 345-355

20 Perry IBID pp 22 - 10 to 22 - 11

21 SAC, IBD pp 8-60

22 Leiman A., "Auditing Local Area Networks: Concepts, skills, and procedures, Journal of Accounting and EDP, Volume 3, Number 4, Winter 1988, P35
Leiman, Op.Cit, PP 37 - 38

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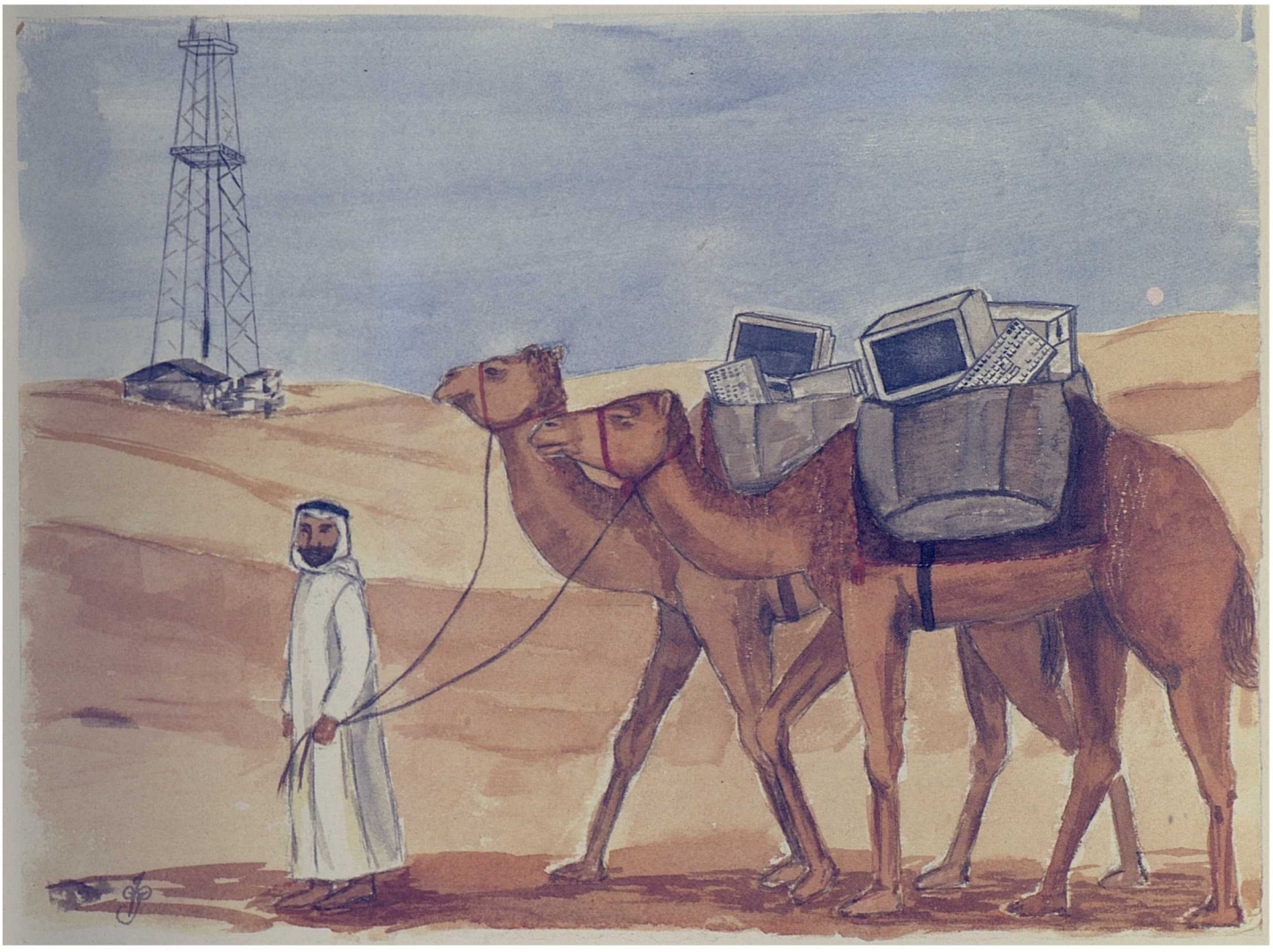
The Impact of Computer Technology on Accounting and Auditing in the Middle East with Special Emphasis on Arabisation, Transfer of Technology and Training



CHAPTER 4

RESEARCH METHODOLOGY

CHAPTER IV

THE RESEARCH METHODOLOGY

4.1 Introduction

The intent of this research has been to review the current status of computer technology worldwide and in the Middle East, to outline the areas of concern, particularly those dealing with arabisations of software, transfer of technology by expatriate workers and companies and training and use of technology, by businesses, governments, auditing firms and educational institutions. There is a very limited number of studies related to computer technology in the Middle East even though there are a number of articles on computerisation in the Middle East but they provide a very limited perspective of the pertinent environment. The research methodology used in these articles and studies make them amendable to very subjective interpretations. To achieve the degree of objectivity that was required, it was decided to collect the required data in three phases.

In phase one a detailed questionnaire was developed for each of the following categories:

- Computer Hardware and Software Users;
- Audit Firms;
- Colleges and Universities; and
- Computer Hardware and Software Suppliers.

As part of this phase a pilot study was conducted whereby a series of face to face interviews were performed with a selected number of representatives of computer hardware and software users, auditing firms, colleges and universities and hardware and software suppliers.

In the second phase of the study, based on the findings from the second stage, a structured questionnaire was modified and sent to representatives of the research environment. The analysis of these data is given in Chapter 5.

Phase three involved interviewing through research interview questionnaire a selected representatives of the business and educational community in the Emirates of Abu Dhabi who were already identified in phase one.

4.2 Research Environment

4.2.1 The GCC political social and economical environment

The Arabian peninsula is the heartland of the Arabs, birthplace of the Prophet Muhammed, and focus for nearly one billion Muslims worldwide who turn to Mecca to perform their devotions to God.

But among non-Muslims, Arabia remains largely unknown and misunderstood. The image of tribal nomad in the desert on a camel persists, or else has been replaced by the equally simplistic view of the oil sheikh in a Cadillac. It is true that the region has leapt from a largely subsistence existence to one of great wealth in just one generation, but there is far more that goes unseen.

The region can boast a rich cultural history of literature, art, mathematics and scientific discovery, exploration, trading and conquest. Today the Gulf countries have modern economies as a significant trading block, a source of high quality exports, and up-market tourist destination.

The most homogeneous of the Arab countries, the oil producers along the Arabian Gulf banded together in 1981 to form the Arab Gulf Cooperation Council (AGCC), comprising Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates.

These Gulf countries have modernised dramatically, developing their infrastructure, taking what is best in international technology, while retaining their age-old customs and culture. As a result, the countries of the Gulf have managed to benefit from advances in areas such as heath and technology while retaining own distinctive identity.

Today the Gulf Arabs, with their countries' earnings still stretching the imagination, have established hospitals, health clinics, universities and schools to aid future progress and provide support for the elderly, infirm and others in need. They have built beautiful houses, established highways, ports and more than a dozen airports and at the same time have set an example to developed nations by their generous donations to less fortunate countries.

They have let the foreigners helping them build their nations, take out unlimited savings. They have electrified their lands extensively, and have provided cheap and abundant food for everyone. Water, once the scarcest asset, has been made widely available through ambitious programs of desalination. They are turning now to solar energy, another unlimited benefit, but one previously little exploited.

Over the centuries the Gulf had been a source of strategic and commercial ambition for many foreign powers besides Britain: Portuguese, Dutch, French, Turks and Germans, had all enjoyed or aspired to influence there. Latterly also, rivalry between the United States and the Soviet Union, partly over regional influence, partly over warm water access and partly over safe passage for oil exports, had provoked concern. So in 1981 during the Iraq-Iran war which was affecting every country of the Gulf, the Arab Gulf Cooperation Council was formally envisaged by Gulf rulers meeting at an Islamic conference in Taif, Saudi Arabia. The projected form was initially nebulous. Now, after a decade, what began as a neighbourly gathering into an intricate grouping of nations co-ordinating industries, negotiating advantageous trade and business terms, mutually advancing their social, cultural, educational and health interest.

For citizens of the countries it has brought greater freedom to travel within the member countries, to invest or set up business elsewhere in the grouping, or simply to trade. And there is a commonwealth of shared heritage to be explored, preserved, and to be developed and encouraged far more than before. So firm were the joins between nations that military co-operation was also entered into. After initial joint manoeuvre, held in the UAE in 1983, a joint rapid deployment force was formed, based in Saudi Arabia, and the AGCC armed forces fought together in the war to liberate Kuwait.

The AGCC states want to see the Arabian Peninsula and the Gulf region stable, free from external influence, economically independent and as self-sufficient as possible. They would especially like to stimulate trade and investment within the Arab and Muslim World, and in the developing countries generally. Europe's recent East-West realignment may help the AGCC countries to step up energy and industrial exports to markets of the Soviet Union and Eastern Europe. At the same time they would hope to increase economic activities in Europe, the United States and the Far East, especially Japan.

The AGCC states represent one of the world's wealthiest trading blocks, comprising distinct entities with a unified purpose and view, to be an important, active part of the modern world political and economic scene while preserving the best of their traditions and their commitment to Islam.

In the following paragraphs a brief background on each member state in the AGCC is given.

4.2.1.1 United Arab Emirates

The UAE became by federation a country bigger than Scotland, albeit 70 per cent desert. Not many people realise that Abu Dhabi, the UAE capital, with a distinct Manhattan look, also comprises 30 islands - 24 inshore and six well out in the Gulf. The federation is governed by a 40-member national council headed by the President, HH Sheikh Zayed bin Sultan Al Nahyan, Ruler of Abu Dhabi.

4.2.1.2 Bahrain

BAHRAIN: A cluster of up to 33 islands, Bahrain territory shows clearly the elusive nature of the myriad shoals, spits and sandbanks that make Arabian Gulf waters so tricky to navigate. Here, by historic chance, is the first country of the Six to have developed an intelligentsia - the first of the Six also to have come to terms with oil depletion. It was the first among them to strike oil - more than 600-meters beneath the 120-metre hill, Jebel Dukhan in June 1932. Under its Amir, HH Sheikh Isa bin Sulman Al Khalifa, Bahrain has commendably coped with oil's passing, developing

alongside a major offshore banking centre, an aluminum smelter, a drydock capturing up to 12 per cent of the world's shiprepair business, and a petrochemical complex (first fruit of AGCC membership). Far from thinking smaller as the oil runs out, Bahrain is expanding territorially through land reclamation, and it now has a 35 km causeway, a $1 billion worth of concrete umbilical cord, attached to Saudi Arabia.

4.2.1.3 Saudi Arabia

SAUDI ARABIA: A sovereign state since 1932, it has not always been as affluent as today, possessing 25 per cent of known world oil reserves, and 40 per cent of known Arab reserves. During the Second World War, Saudi Arabia suffered economically for its friendship with the United States and its Allies. Saudi Arabia had to be included in American lease-lend in 1943, but by 1948 had used its oil to get back on its feet. With this background, American readiness to help defend the Saudis against threatened Iraqi aggression today is more readily understood. Saudi Arabia combines its entry to the modern age of science and technology with its ongoing commitment to guard and preserve Islam, and it yearly hosts the biggest single gathering of pilgrims of any faith. Under His Majesty King Fahd Ibn Abdulaziz, Custodian of the Holy Shrines, it is regarded as being one of the two major voices of Arab moderation, the other being Egypt.

4.2.1.4 Oman

OMAN: Sentinel of the strategic Strait of Hormuz, through which much of the world's oil passes, has been famed from early times for its copper and incense, both of which now enjoy a manufacturing and trading revival. The incense, still among the world's finest, is a vital ingredient in the world's most expensive perfume which is made there today, and which is as easily lifted as it was in all Arabia in 450 BC, when the historian Herodotus wrote of `an odour marvellously sweet.' Oman is also noted for its silver filigree work. But the Sultanate's most famous `product' throughout history is probably its sailors. Fearless aboard their dhows of log and coir, they sailed as far as China to trade, trusting God and a good wind to rejoin them with their families, perhaps only years later! An Omani pilot guided Vasto da Gama to India. Latterly, under His Majesty Sultan Qaboos bin Said Al-Said, Oman has become an oil producer.

4.2.1.5 Qatar

QATAR: Like Oman, Qatar was little known or explored until comparatively recently. Yet it was the first among the AGCC states to award an offshore prospecting concession, and the first of the states to diversify away from oil and into heavy industry. Its people were very poor once. Now futures there should be assured, even when the oil runs out in perhaps 30 years, thanks to the possession of one of the world's biggest deposits of natural gas. Under its Emir, HH Sheikh Khalifa bin Hamad Al Thani, it has become one of the world's most prosperous countries.

4.2.1.6 Kuwait

KUWAIT: Northern Arabia's trading crossroads for centuries between East and West, is still a strategic territory, as recent unhappy events show. Second only to Saudi Arabia as a Middle East oil producer (and one of the world's most prolific producers of children too.) Kuwait had already enjoyed a decade of independence itself before the lower Gulf states emerged. A country noted worldwide under its Emir, HH Sheikh Jaber Al Ahead Al Jaber Al Sabah, for scintillating and often unexpected diplomacy and foreign policies (which is why it has drawn such immense support from the United Nations in its fight for survival), Kuwait has also allowed its women to be model progressives for other parts of the Arab World (1).

4.2.2 Use of Expatriate Workforce

One way in which the Gulf has changed is through the presence of a large expatriate population. Millions of workers from the Indian subcontinent, Europe, the USA and the Far East flocked to the region to sell their skills and their wares, contributing to the development of the Gulf.

The expatriates initially came to aid the establishment of the oil industry, then to assist in the construction boom that followed OPEC's successful realignment of oil prices. Now they are involved in technology transfer, as the Gulf's economies diversify away from hydrocarbons to light industry and all manner of production and service industries.

It is here that the formation and of the AGCC has demonstrated some of its most significant successes, allowing the relatively small Gulf countries to bargain with the world's trading blocks, ensuring fairer treatment for their industries and exports, for the Gulf countries now export internationally. The AGCC has also encouraged a rationalisation of resources, avoiding the duplication of facilities, planning an AGCC electrification grid, and integrating the markets of the six member-states by unifying standards and eventually eliminating any differences in import taxes.

As was seen in the conflict with Iraq, the AGCC countries have also banded together politically and militarily, and this experience has served to strengthen the ties and moves toward further integration.

The indigenous people of the Arabian Peninsula are of one common stock, arriving from the Tigris Euphrates delta at a time when the climate was more hospitable than today, for the region was not always the desert that we now see.

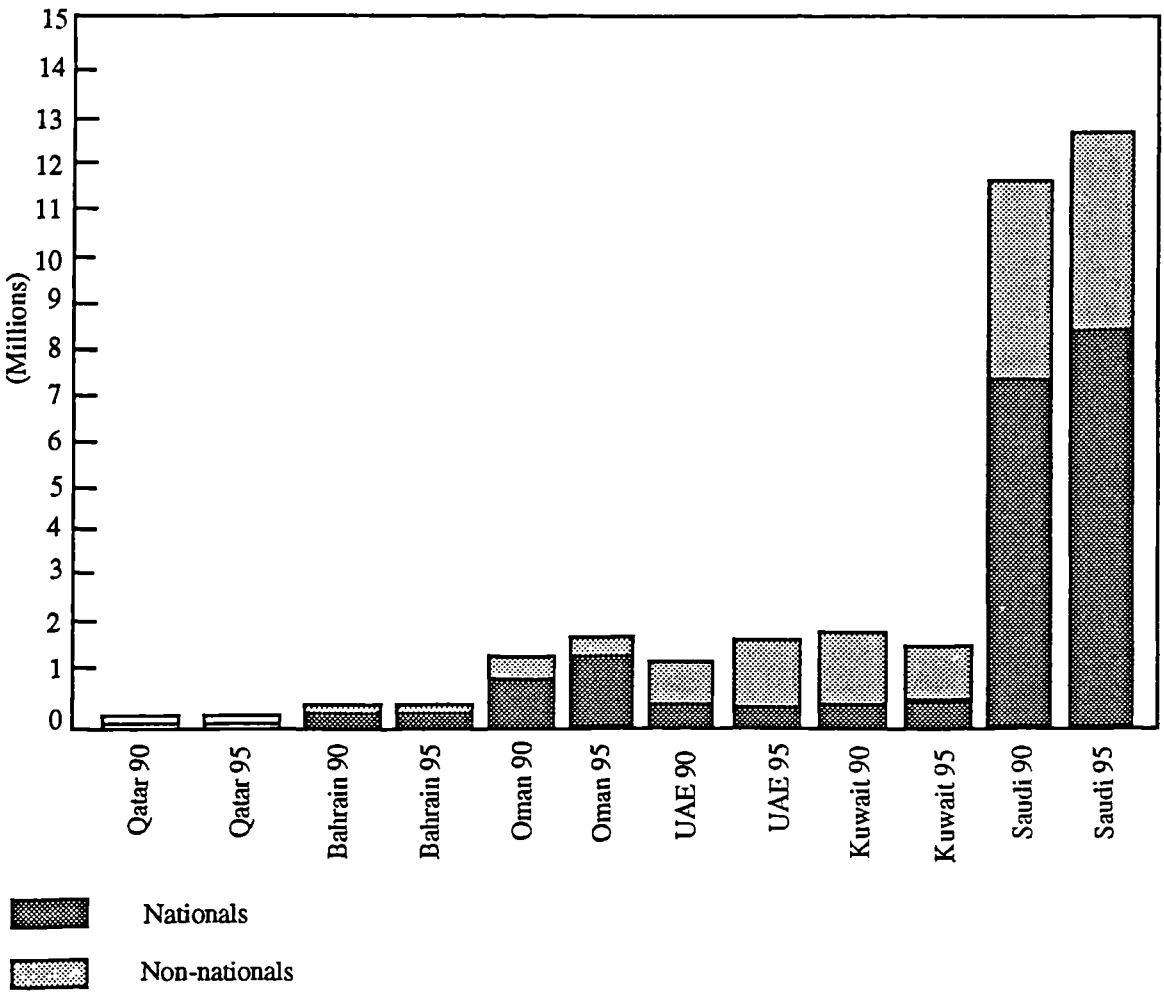
That there was life in Arabia at least 16 million years ago is agreed by scientists, whose findings show that the Arabian Peninsula was fed by the Tigris and Euphrates rivers, as far south as Abu Dhabi, rather than just to the head of the Gulf as now. The Red Sea was closed at the southern end, providing a natural causeway over which many animals could cross. The mammoth, the ape, the crocodile, the rhinoceros have all roamed Arabia. One creature keen to linger was, of course, the camel, whose doubly sure hoof, sound in snow or sands, brought it across the Bering Strait between East Asia and America (2).

4.2.3 Projections of Gulf populations

4.2.3.1 Demographic growth

Demographic growth according to Dr Stace Birks, director, Birks sinclair and associates research centre, Durham, UK that the GCC states demographic growth will remain strong to the year 2000.

Table 4.1 GCC Populations 1990 and 1995



Source: Estimated by Birks Sinclair & Associates Ltd

By late 1999, the population of the six Gulf Cooperation Council (GCC) States of Bahrain, Kuwait, Qatar, Oman Saudi Arabia and the United Arab Emirates (UAE) will top 23 million, barring another outbreak of war or an unlikely major shift in economic and social policies throughout the GCC states. This represents - in GCC, though not in regional Arab terms - huge demographic and market expansion, an increase of 5.5 million people (35 percent) over the 17.9 million that opened the decade.

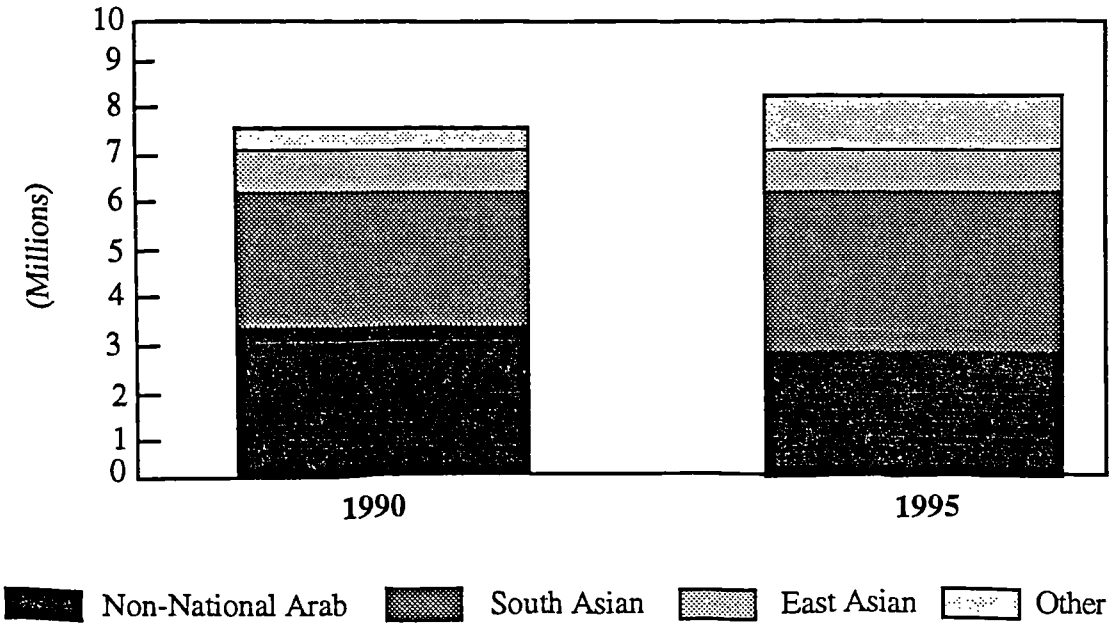
The aggregate GCC national population will increase from 9.9 million (1990) to 13.5 million by the end of 1999, growth of some 3.5 million, or 35 percent. Most of these additional numbers are through natural increase, rather than granting naturalisation, which are assumed to remain at a relatively low level. Although numbers of youthful nationals - under 15 years old - increase most in absolute terms, towards the end of the decade, the rates of increase of the older sections of the population become sharp and startling.(3)

4.2.3.2 Expatriates population

According to Dr Birks Non-nationals Increase too: 43 percent of the population will be Non-national in 1999.

Non-nationals, who amounted to 7.9 million in 1990, would grow to almost 10 million in number by 2000, and increase of over 25 percent. The rate of increase of non-national workers is greater, but shifts in the nationality blends of non-nationals living in the GCC serve to moderate the overall increases in population growth, especially early in the decade.

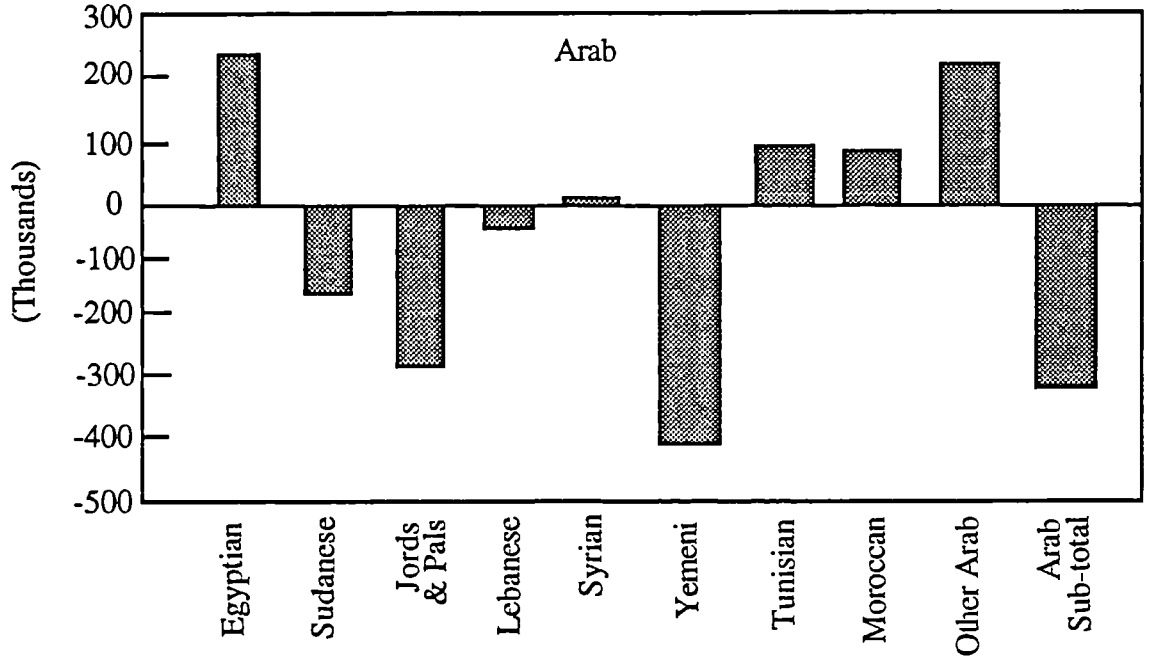
Table 4.2 - GCC Non-national Populations 1990 and 1995



Source: Estimated by Birks Sinclair & Associates Ltd

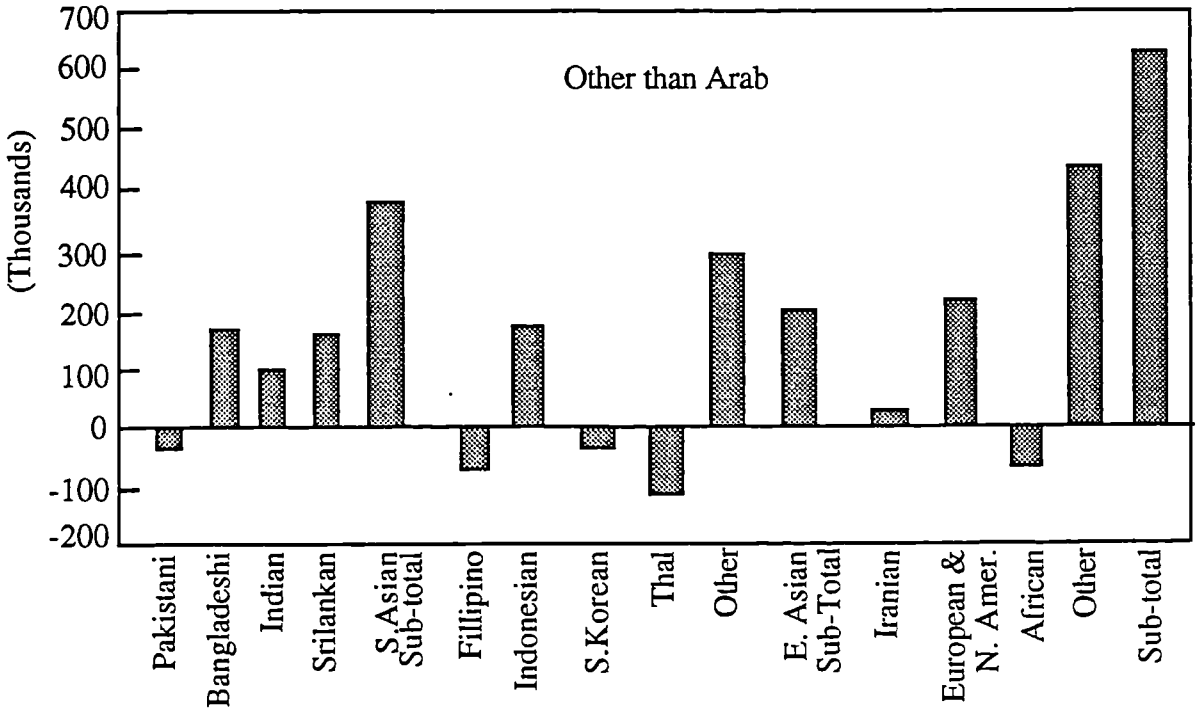
Overall, the share of non-nationals in the total population of the GCC eases slightly down to 43 percent. By 1999, there will be no transformation of GCC society, economy of market caused by a dramatic decline in reliance on non-nationals. Indeed, in some of the fastest growing states, the share of nationals in the population falls over the decade, Non-nationals remain important as consumers in the GCC market through to 1999, and will still predominate in some areas of production as the Council passes into the next century. The projected changes in Arab expatriate and Non-Arab expatriate population is given below:

Table 4.3 - Change in Non-national populations 1990 to 1995



Source: Estimated by Birks Sinclair & Associates Ltd

Table 4.4 - Change in Non-national Populations 1990 to 1995



Source: Estimated by Birks Sinclair & Associates Ltd

The above projections underlying the demography described here assume solid economic growth to 1999, gently rising real crude oil prices over the decade, and some success in domestic industrial diversification throughout the GCC. Under this optimistic, but nonetheless relatively conservative economic scenario, the growth of the national population to 1999 is projected to outpace that of the non-nationals.

Only in a few instances, most markedly in Oman, do any GCC states, once over the effects of the invasion of Kuwait, experience declines in their non-national populations. Generally, growth in aggregate non-national populations is steady in all of the GCC states, even though some individual non-national nationalities decline in numbers.(4)

4.3 Research Targeted Population

A definition of the research targeted population was developed to include the following:

- computer hardware and software users
- external auditing firms operating in the Gulf Region.
- universities and colleges
- computer hardware and software suppliers.

The objective of this section is to provide details of the overall population by country and industry who were approached to participate in the research. This diversity of the organisations approached in the researcher's view would enhance this quality of responses to this research questionnaire.

A second objective is to provide the rationale leading to the selection of these organisation. Expressed in Brunswick [1952] lens (BL) model terms, this section can be considered as a clarification of the judges used in obtaining the relevant perceptions (i.e those individuals who were asked to respond to the research questionnaire).

4.3.1 Overall Population by Industry and Country

The following tables gives a breakdown of the organisations A-D institutions

Table 4.5 - Overall targeted population by country

	Organisation approached		Organisation Responded	
	No	%	No.	%
United Arab Emirates	497	36.68	50	17.86
Qatar	104	7.68	11	14.67
Bahrain	178	13.14	11	8.46
Kuwait	146	10.77	6	5.94
Saudi Arabia	274	20.22	12	3.31
Oman	153	11.22	4	0.00
Others	3	0.22	0	
Totals	1355	100.00	94	6.94

Further breakdown of organisations approached by industry is given below:

Table 4.6 - Overall targeted population by industry

	Organisation approached	
	No	%
Government agencies	100	7.38
Educational establishment	32	2.36
Computer suppliers	312	23.03
Audit firms	163	11.96
Other business:		
Oil industry	51	3.76
Manufacturing and Contracting	51	3.76
Retail and leisure	50	3.69
Financial	160	11.81
Transport	294	21.70
Transport	143	10.55
Totals	1355	100.00

Breakdown of primary and secondary sources of information is given in section 5.2

4.3.2 Computer Hardware & Software Users

There has been an immense change in the last two decades on the way businesses throughout the Gulf obtain and process information. The region has witnessed the increasing relevance of information technology in the middle east.

Computers have proved to be an effective tool which can provide business with the required information when used wisely with the right information and expertise and when good practices are applied.

Table 4.7 - Number of computer hardware and software users approached by country

	Organisations approached		Organisations responded	
	No.	%	No.	%
United Arab Emirates	280	32.98	23	8.21
Qatar	75	8.83	8	10.67
Bahrain	130	15.31	6	4.62
Kuwait	101	11.90	4	3.96
Saudi Arabia	142	16.73	4	2.82
Oman	121	14.25	2	1.65
Others	0	0.00	0	0.00
	849	100.00	47	5.54

Effective use of information technology is seen by many users as one of the ways in which organisations can improve the efficiency of their operation, and therefore the competitiveness of their businesses.

The selection of computer hardware and software users in various countries in the Gulf of was based on the contributions they may make in increasing our understanding of the critical issues facing the local and expatriate users in the gulf which are:

- Arabisation of software
- Transfer of skills to the local community
- Training

This is more so because of the fact that the main local users of information technology in various sectors and industry in the middle east including banking, construction, travel, oil, education and governments are moving in the direction of nationalising jobs.

4.3.3 External audit firms

External audit firms are considered by the public as agents of change. They are entrusted with public confidence and their contribution over the years has gone beyond expressing an opinion on the financial statement. The value added by the audit function has been described in terms of the enhancement of the value of financial accounting information and the provision of related services to management.

INFORMATION AND COMPUTER SYSTEMS

- Feasibility Studies
- Strategic Planning
- Hardware and Software Selection
- Security and Control Reviews
- Installation Assistance
- Telecommunications Studies

Technological innovations in the field of computers impacted on the way external auditors perform their tests. Computer - assisted auditing techniques and computer - based systems are common techniques used by the "Big 6" firms however small practitioners operating in an environment of growing complexity, knowledge explosion, specialisation, and multi nationalism will face certain difficulties competing with international firms.

The table below summaries the number of international and local external audit firms operating in the region

Table 4.8 - External audit firms approached

	Organisations approached	
	No.	%
United Arab Emirates	65	40.12
Qatar	10	6.17
Bahrain	12	7.41
Kuwait	12	7.41
Saudi Arabia	46	28.40
Oman	17	10.49
Totals	162	100.00

Source: Gulf telephones and business directories

The external audit research questionnaire dealt with three distinct parts as follows:

Part 1: General information: To determine the size of organisations and the composition of its staff.

Part 2: Scope of activities: To determine the mix of businesses being audited and level of staff by nationality , their knowledge of computer.

Part 3: Training: To determine the type of computer training given to staff and clients alike and the possible transfer of technology.

The external audit questionnaire was designed to measure the level of contributions made by external firms in terms of transfer of skills, Arabisation and training.

4.3.4 Colleges and Universities

Colleges and Universities in the middle east have been slow reacting to the introduction of computer technology and there has been no official introduction of computers into state schools within the region. However Saudi Arabia anticipates that all secondary schools will have computers by 1995. Kuwait, Oman and the UAE are running pilot schemes, and Qatar has set up a teacher training and software development centre.

Private schools on the other hand have introduced computers in every aspect of their work.

The following table summarises the number of organisations approached in each of the GCC states.

Table 4.9 - College and Universities approached

	Organisations approached	
	No.	%
United Arab Emirates	*8*	25.81
Qatar	3	9.68
Bahrain	7	22.58
Kuwait	0	0.00
Saudi Arabia	10	32.26
Oman	3	9.68
Totals	31	100.00

Source: Gulf Telephones & Business Directories

The research questionnaire was prepared in 5 parts as follows:

Part 1: General information

This part is designed to gather information about the educational institutions such as language of lecturing, number of users etc.

Part 2: Computer related policies

This part intended to identify policies and guidelines related to the introduction of information technology in universities and colleges to benefit these institutions.

Part 3: Scope of activities

Designed to identify whether specialised computer courses were offered by faculty and to identify the universities and colleges staff mix by nationality and their computer skill.

Part 4: Instructor in service and training.

Designed to measures in per centage terms computer literacy within the educational institutions.

Part 5: Options for ministry of education leadership in computer technology.

Designed to determine the role played by the ministry and options available to it to ensure that computer education is provided within the educational system.

4.3.5 Computer hardware and software suppliers

Because of the huge market prospects for computer based systems, computer products and related software in this Gulf, almost all the international industry Leaders in hardware and software are represented. Hardware companies who are dominating the market are those international computer companies who set up their presence in the region. Almost all brand names have presence IBM dominates a shrinking mainframe market NCR, ICL, HP Apple and a host of other smaller companies also share the market through a network of agents and distributors. A considerable number of international software companies have also set-up offices in the region, including Microsoft Oracle and SCO.

The following table summarises the number of organisations approached in each of the GCC states.

Table 4.10 - Computer Hardware And Software Suppliers Approached

	Organisations approached	
	No.	%
United Arab Emirates	145	46.47
Qatar	16	5.13
Bahrain	31	9.94
Kuwait	32	10.26
Saudi Arabia	72	23.08
Oman	13	4.17
Others	3	0.96
Totals	312	100.00

Source: Gulf Telephones and Business Directories

The computer hardware and software research questionnaire was prepared in 5 parts as follows:

Part 1: General information

This part is designed to gather general information on the organisation including its size, Arabic language ability, staff mix and turnover.

Part 2: Scope of activities

This part is designed to identify the nature of products and services offered by the organisation.

Part 3: Application software

This part is designed to identify the type of application software the organisation offers, language of operation and whether the software packages are developed internally.

Part 4: User training

This part is designed to identify user training provided and areas of expertise.

Part 5: Further comments

Part 5 is designed to give the organisation the opportunity to express its additional views or comments which are relevant to the study.

Overall, the research questionnaire was designed to measure in real terms the level of contribution made by the hardware and software suppliers organisations to the region and the level of Arabisation training and skills transfer offered which are so badly needed in the region.

4.4 Approach

4.4.1 Phase One- Available Literature

Other studies cited in the literature have been reviewed for relevance and historical analysis of the evaluation of computer technology and the stages of its development have been prepared.

4.4.2 Phase Two - Pilot Study

Pilot Study was carried out to achieve an in-depth knowledge on information requirement analysis for each member of the research environment. A face to face interview was arranged with a selected sample from the targeted population to test their responses to the structured questionnaire and to measure their reaction to the wording and content of the questions. The outcome of these interviews assisted in clarifying some of the ambiguities surrounding some of the questions and the relevance of others. This added knowledge assisted in the modification of the structured questionnaire given in Appendices 1 to 4.

4.4.3 Phase Three - The Structured Questionnaire

A structured questionnaire was developed to measure the impact of computer technology on the accounting and auditing profession in the Gulf States. All data collected by means of questionnaire on the basis of standard case questionnaire have been analysed using a computer program to test the research hypotheses on Arabisation, transfer of technology and training as given in section 3.6.

Findings: Generalised and specific conclusions have been drawn from the data which after testing have been presented as the findings of this research, followed by specific futuristic recommendations tailored to address the needs of the region.

4.4.4 Phase Four - Interviewing Through Research Interview Questionnaire

A structured Interview Questionnaire was developed subsequent to the researchers analysis of data collected in Phase Three which was completed in 1991. Phase II Research Interview Questionnaire. As given in Appendix 5 was designed to measure the severity of impact of the following specific areas:

- Arabisation
- Transfer of Technology
- Computer Training

It was considered critical to the completion of the research that such interview questionnaire be developed and for such information to be collected to validate finding and conclusions derived from the four part structured questionnaire given in Appendices 1 to 4.

4.4.4.1 Development and Approval Process of Research Interview Questionnaire

The Research Interview Questionnaire (Appendix 5) contain questions dealing with Arabisation Transfer of Technology and Computer Training. Focusing on critical issues identified in the structured questionnaire.

A rigid review and approval process was followed by the Researcher to ensure that Interview Questionnaire are precise in meaning and adequate enough to satisfy the research requirements. The following approval process steps were followed:

- Obtaining initial review by the Researcher's Supervisor (Professor George Selim).
- Making all amendments as recommended by the Researcher's supervisor.
- Testing of Research Interview Questionnaire by five Academics from City University Business School:
  - Graham Bull
  - Robert Melville
  - Anne Leeming
  - Ann Brown
  - Professor C. Holtham

- Receiving feedback and making amendments as suggested by the five Academics. Changes leading to the improvement of wording, style and relevance were made.
- Resubmitting the Research Interview Questionnaire for final approval by the Researcher's Supervisor.
- Pilot testing of Research Interview Questionnaire on a Representative sample basis within the Emirates of Abu Dhabi from each targeted group as follows:

	Number
• Computer Hardware and Software Users;	12
• Auditing Firms;	2
• Colleges and Universities;	2
• Computer Hardware and Software Suppliers.	10

Suggested changes to the wording, style and content of the questionnaire were made to clarify questions as well as improving the quality of the questionnaire including the sequence in which the questions were asked.

- Full scale interviewing

4.4.4.2 Development of Interview Plan

The following interview plan was developed after consultation with the Researcher's supervisor regarding the mix and number of individuals to be interviewed.

INTERVIEW PLAN - NUMBER OF INDIVIDUALS TO BE INTERVIEWED

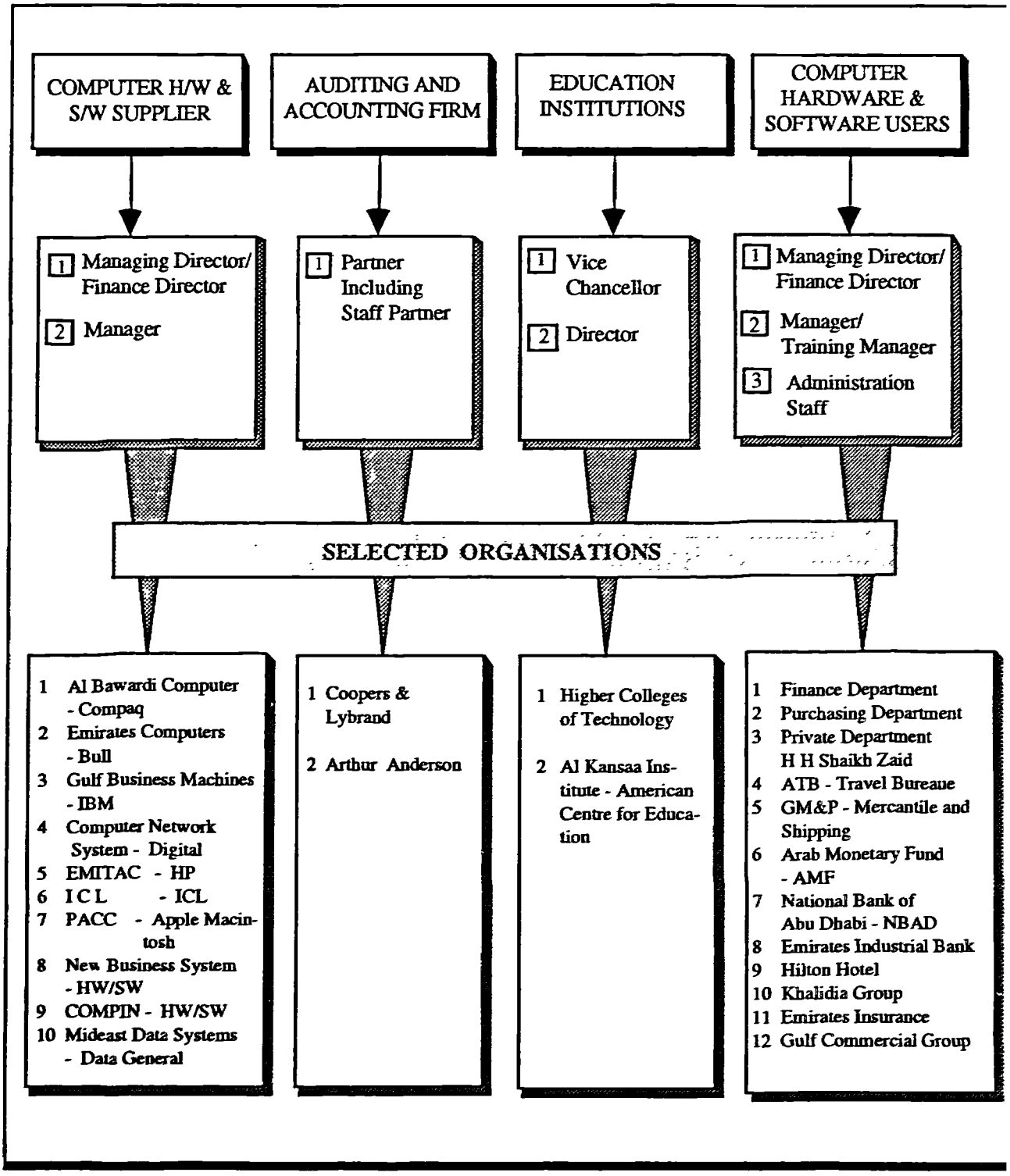
	Organisation	Individual	Total Number of Individuals
COMPUTER SUPPLIERS			
Managing Director	10	1	10
Finance Director		1	10
ACCOUNTING FIRMS			
Partners	2	2	4
EDUCATION INSTITUTIONS			
Vice Chancellor	2	1	2
Directors		2	4
USERS			
Finance Director / Managing Director	12	1	12
Manager / Training Manager		3	36
Administration Staff		2	24
			102

4.4.4.3 Selected Organisations

26 diverse of Organisations were Identified from the list of Organisations from the Emirates of Abu Dhabi who originally responded to the Four Structured Questionnaire given in Appendices 1 to 4 as follows:

INTERVIEW PLAN

SELECTED ORGANISATIONS



4.4.4.4 Key characteristics of individuals interviewed

The following summarises the key characteristics of individuals interviewed:

- Age : Age ranges between 30 and 45 years
- Sex : All interviewees were males
- Education : Majority of interviewees were educated to a University level. However the researcher is unsure of the type of University or of their other professional credentials.
- Nationality : Interviewees may be separated as follows:
  - UAE Nationals 10%
  - Expatriates (Arabs, Asian, European and North Americans) 90%

4.4.4.5 Conducting The Interviews and Interpreting the Data

A phased approach was developed and carried out as shown below:

- Individuals within selected Organisations were contacted in advance and advised of the interview plan.
- Appointments were made.
- Interviews were carried out.
- Results of the interviews were documented for further analysis.

Full statistical testing of the outcome of Research Interview Questionnaire is given in Chapter VI.

REFERENCES

1 FairService, I. and Grieve, C. "Arabian Profiles" Motivate Publishing, United Arab Emirates, 1991, pp 5-11.

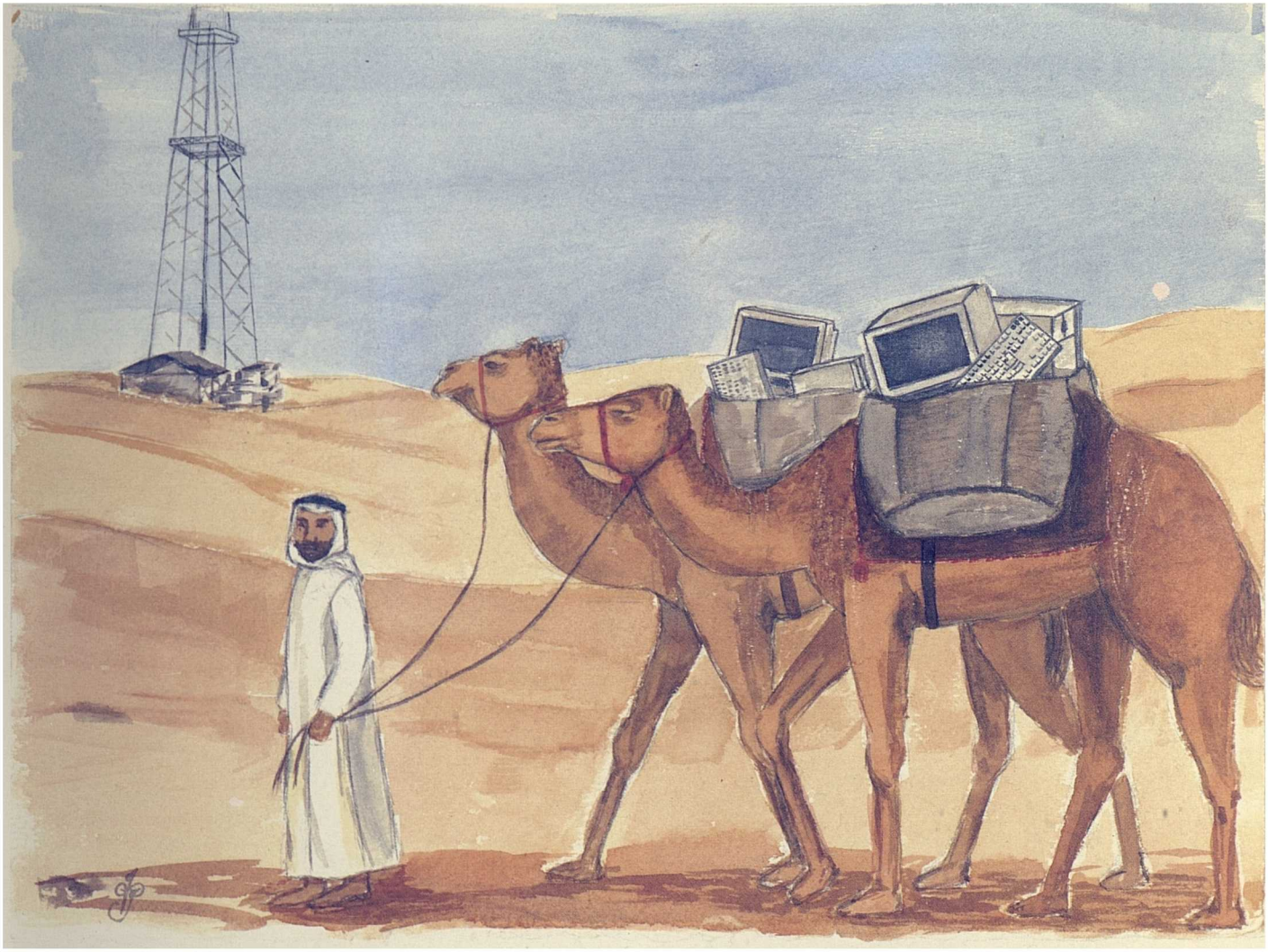
2 Fairservice, IBID

3 Birks, Stace Dr "Gulf Population Through The 90's" Sinclair and Associates, Mountjoy Research Centre, Durham, UK 1992, pp 1-6.

4 Birks, IBID

CITY University
BUSINESS SCHOOL

The Impact of Computer Technology on Accounting and Auditing in the Middle East with Special Emphasis on Arabisation, Transfer of Technology and Training



CHAPTER 5

DESCRIPTIVE ANALYSIS OF DATA COLLECTED PHASE THREE

CHAPTER V

DESCRIPTIVE ANALYSIS OF DATA COLLECTED - PHASE THREE

5.1 Introduction

The purpose of this chapter is to provide detailed analysis of responses to the various situation questions on "The impact of computer technology on the accounting and auditing profession in the Middle East". The first section of the chapter deals with general information and the mutual aspects which applies to the four research groups, while the remainder of the chapter considers the particular aspects within each group. As explained earlier the research focused on four key main players in the Middle East who in the view of the researcher within the context of this research may and do contribute to the advancement of knowledge of computer technology in the Middle East. They are namely:

(a) Computer hardware and software users

(b) The auditing profession

(c) Colleges and Universities

(d) Computer hardware and software suppliers

5.2 Sources of Information on Targetted Audience for the Survey Questionnaire

5.2.1 Introduction

"An old human peculiarity is that while people may possess a healthy distrust of what they are told all too often they accept without question what is written, especially when it appears in a respectable publication The computer literature is a mass of dreams myths and misconceptions, with a leavening of fact. A measure of healthy scepticism is necessary on the part of the seeker of information if he is not to be misled. He must recognise that on occasions both the publisher and the writer of articles have positions of bias of self-interest that may conflict, sometimes unintentionally with the veracity of what is described". (1) It is with this understanding that the researcher has approached the information he collected and provided by the various sources mentioned in this research.

Some of the most notable computer publications and sources of information on computer hardware and software suppliers in the Middle East are given in the following paragraphs.

5.2.2 Main sources of Information on Computer Hardware and Software Suppliers

The following publications publishes listing of suppliers and products in the Middle East and have been used by the researcher to compile a list of contacts for the research questionnaire:

(a) Computer guide-Middle East published by Alain Charles Publishing Emirates Printing Press, Dubai, UAE.

(b) Emirates Business computing published by Information and Technology Publishing Co, Ltd. Hitchin, United Kingdom.

(c) The Arabian Systems Guide published by Information and Technology publishing Co Ltd. Hitchin, United Kingdom.

(d) International Computer Magazines such as Byte & PC world.

The Middle East Computer Industry association (MEICA) is a new organisation that has been formed by manufactures and providers of information technology products and services in the Middle East, MEICA. The organisation, according to its literature is dedicated to increasing the contribution of technology to the future growth and development of the Arab world. the stated aims of MEICA are as follows:

- Drive out software piracy through implementation of the "Campaign Against software Piracy", and isolate pirates from the rest of the industry
- Support Arabisation and standardisation of the computer industry and by encouraging real Arabic applications to meet Arabic user requirements
- Guarantee to the public, through the MEICA Code of Practice and Conduct, the highest possible standards of service both now and in the future
- Increase and broaden people's knowledge of important computer related issues through public awareness campaigns
- Provide legal, information and arbitration services to its members

In the view of the researcher that MEICA's aims will be fully achieved in an environment where copy rights do exist and protection of international trademarks and intellectual property is respected. Unless governments take the necessary legal measures to prosecute those who violate copyrights and to also devise the appropriate measures to ensure compliance.

5.2.3 Telephone Directories of Businesses in the Gulf

The following telephone directories were used by the researcher to identify computer hardware and software users, accounting and auditing firms, colleges and universities and computer hardware and software suppliers and was also used to compile a list of addresses for the research questionnaire:

1 The Gulf directory 1990-1991
The Gulf Business and Industry Directory published by Falcon Directory Publications WLL, Manama, Bahrain

2 Computer Guide Middle East 1992 published by Alain Charles Publishing Emirates Printing Press, Dubai, UAE

3 United Arab Emirates Business Directory 1991 published by Frontline Advertising and marketing, Sharjah, UAE

4 A-Z United Arab Emirates Business Locations Guide 1989 published by Hawk Publishing, Ajman, UAE

5 United Arab Emirates Telephone directory 1991 published by the Emirates Telecommunications Corporation Limited, Abu Dhabi, UAE

6 Bahrain Telephone Directory

7 Qatar Telephone Directory published by Qatar Telecommunications Corporation

8 Sultanate of Oman Business Directory published by Apex Publications.

9 Saudi Arabian Telephone Directories

10 Kompass Telephone Directory published by Kompass, UAE

5.2.4 Other Sources

1 Listing of computer users provided to the researcher by various computer suppliers

2 Listing of computer users provided to the researcher by various audit firms operating in the region

3 Personal contacts

5.3 Overall analysis of survey responses

5.3.1 Introduction

The research findings are based on a questionnaire mailed to 1355 organisation in the Gulf. The response rate was 6.94% or 94 organisations. The replies obtained together with relevant comments from respondents were used to primarily held develop a picture on the status of computerisation in the Middle East relevant to the accounting and auditing profession, users and suppliers of the computer technology and the universities and colleges.

The emphasis of chapters five and six is on the descriptive analysis of data collected through survey questionnaire and interviews. Statistical analysis and testing of Hypotheses is presented in chapter seven.

The following summarises all users responses in connection with the research survey which has focused on eight interrelated areas:

- General information about the entire population selected for the survey including, size, type and population mix of the respondents by type of business and nationality.
- Identification of application systems and users.
- Identification of the type of computer hardware used by the various users.
- The type of application software employed.
- Training provided to users and its sources. Training is common to all users and is applicable to both users and providers of the technology.
- Scope of activities of the population selected.
- Computer related policies in the educational institutions.
- Options available for education in computer technology.

The first two areas were covered in section 5.3. The remaining areas will be covered in the rest of this chapter.

5.3.2 Number of organisations responded by country

The number of organisations responded to the survey questionnaire is given below:

Table 5.1 : Overall response by country

	Organisations approached		Organisations responded	
	No	%	No	%
United Arab Emirates	497	36.78	50	17.86
Qatar	104	7.68	11	14.67
Bahrain	178	13.29	11	8.46
Kuwait	146	10.71	6	5.94
Saudi Arabia	274	19.94	12	8.45
Oman	153	11.37	4	3.31
Others	3	0.23	0	0.00
	1355	100.00	94	6.94

It can be seen from the above table that more than 6% of the organisations approached have responded to the survey questionnaire. All the major government departments and private commercial enterprises were covered.

5.3.3 Number of organisation responded by sector within country

The number of organisations responding by sector may be summarised as follows:

Table 5.2 : Response by sector

	Computer hardware & software Users	Audit firms	Colleges & Universities	Computer hardware & Software suppliers	Total
United Arab Emirates	23	1	7	19	50
Qatar	8	2	-	1	11
Bahrain	6	1	-	4	11
Kuwait *	4	-	-	2	6
Saudi Arabia	4	4	1	3	12
Oman	2	2	-	-	4
	47	10	8	29	94

* It should be noted that the survey questionnaire to Kuwait was mailed after the liberation of the country. Accordingly the level of response from Kuwait was less than expected.

Slightly more than half of the responses came from the UAE. The researcher attributes this to a number of reasons mainly the persistence of the researcher within his country of residence and the easy access by which he can reach these organisations.

It should be noted that computer hardware and software users response rate was 50% of the total responses received. Of the individuals responded 50% are in a senior position within their organisation with overall responsibility for the acquisition , development and implementation of information technology.

5.3.4 Language of administration

Of the total who took part in the survey, 83% stated that their main language of administration is English. This high ratio of English language use in administration is not surprising as most of the users are of Non-Arabic origin. It also implies that Arab users are forced by necessity to use the English language as a medium of business communication. This overwhelming use of the English language in the view of the researcher may be attributed to the following:

- Dominance of the English language as an international business, commerce and computer communication language
- Dominance of the expatriate workforce in the Gulf whose first language is Non-Arabic, particularly Asians.

Those who use English as a second language of administration (20%) stated that they use English as a medium of communication in their jobs while (59%) stated that Arabic is the second language of administration used as shown in the following table:

Table 5.3 : Languages of administration

	Main Language (%)	Second Language (%)
English	83.25	20.00
Arabic	15.75	59.00
Other	1.00	21.00
	100.00	100.00

Further analysis of language use by user is given in the following tables:

Table 5.4 : Analysis of main written language of administration by user

	Main language English (%)	Second language Arabic (%)	Others (%)
Computer hardware and software users	72.34	27.66	-
Audit firms	80.00	20.00	-
Colleges and Universities	87.50	12.50	-
Computer hardware and software suppliers	93.10	3.45	3.45

Table 5.5 : Analysis of second language used regularly for administrative purposes by users

	Arabic (%)	English (%)	Others (%)
Computer hardware and software users	53.19	34.04	12.77
Audit firms	60.00	20.00	20.00
Colleges and Universities	75.00	12.50	12.50
Computer hardware and software suppliers	48.28	13.79	37.93

The above tables reconfirm the dominance of the English language as the language most frequently used by information technology users in the Gulf. It also demonstrates the need for Arabisation of software as a tool for transfer of technology and training of locals and Gulf Nationals.

Further analysis of all computer systems users within organisations surveyed totalling 74% users indicated that computer users whose first language is Arabic are comprising only 44.75% while 55.45% are Non-Arab speaking users. the following table further demonstrates this point within organisations surveyed by sector.

Table 5.6 : Computer language of operations

	Computer hardware & software users (%)	Audit firms (%)	Colleges & Universities (%)	Computer hardware & Software suppliers (%)
Whose first language is Arabic	44.92	36.67	58.32	39.19
Who cannot read or write Arabic	55.08	66.33	41.68	60.81
	100.00	100.00	100.00	100.00

5.3.5 Composition of workforce by nationality

Composition of workforce by nationality within organisations surveyed is as follows:

Table 5.7 : Composition of workforce by nationality

	Nationality	Workforce (%)
(a)	Locals/Gulf nationals	12.00
(b)	Arabs from other parts of the Middle East	16.25
(c)	Asians (Pakistanis, Indians)	38.50
(d)	Europeans	8.50
(e)	North Americans	7.75
(f)	Other nationalities	17.00
		100.00

The above figures clearly demonstrate the low level of participation by Locals/Gulf nationals and the heavy dependence on expatriate manpower.

According to a recent study by KPMG on "Information Technology in the Middle East" that a major problem inhibiting the development of Information Technology (IT) in the Middle East is the lack of skill in the local workforce and the subsequent dependence on short term contracting of expatriate managers, analysts and programmers and also external consultants" (2).

The sentiment over expatriate workforce presence has been publicised in a number of newspaper articles in the Gulf. Bassem T Ajami of Gulf News, a local, UAE, English newspaper wrote an article entitled "Presence of expatriates raises many questions" in which he stated that, the issue of the presence of a large number of expatriate workers in the Gulf states continues to be a source of debate. On the one hand, there is the argument that they undermine the national character of the host country, and in some extreme cases may even pose a latent threat to its national security.

On the other hand it is argued that foreign workers are needed in the Gulf states to complement the local work force, and also to fill a need in certain jobs which require skills that are not yet available among the local population. There is no doubt that there is a good deal of reason on both sides of the argument. the question of national character has been controversial not only in the Gulf states but also throughout the Arab world since the end of colonial rule many decades ago.

Moreover, in some Gulf countries the issue has been compounded by the fact that in some cases the local population is outnumbered by the expatriates.

The United Arab Emirates, for example, hosts the largest number of foreign workers of any Gulf state. This has been the case even before the steep rise in oil prices of 1973.

Economic development

Since then, and because of the start of large construction and industrial projects, even larger numbers of expatriates were recruited mainly from countries like India, Pakistan and Egypt.

This situation has directly influenced the demographic structure of the UAE, causing a situation in which the concentration of people in the age bracket 20 to 34 is larger than that of the 10 to 19 bracket. But how does the presence of such a large foreign work force affect the host country?

The presence of a large number of foreigners in any country is bound to have an impact from several perspectives. First, such a work force plays a major role in the economic development of the country by providing skills and performing jobs that could not or would not be performed by the local population.

Second, the expatriates induce new aspects of socialisation and tolerance into the cultural fabric of the host country as well as into their own societies. Third, their presence helps to facilitate trade between the host countries, and those of the expatriates since it creates a favourable economic climate by establishing a form of economic dependency in both countries.

However, in certain cases expatriates are viewed unfavourably by the host country. But in almost all situations, these are cases which are motivated not by economic or social concerns, but mainly by political considerations.

Kuwait a case in point. rightly or wrongly, the foreign workers in Kuwait were blamed in part for what happened there and the events leading to its brutal invasion.

Consequently, severe restrictions are imposed on incoming expatriates there as well as on the renewal of residence permits of those already there. But while the case of Kuwait may be attributed to a policy that is influenced by the invasion and its aftermath, cases of countries like Libya and Iraq are more difficult to explain.

National character

Both countries (Libya & Iraq) have taken severe measures against their foreign work forces including arbitrary dismissal from jobs and deportation.

Libya has done so against Tunisian and Egyptian workers on at least two occasions in the past decade, and Iraq gave similar treatment to Egyptian workers after the end of its war with Iran.

Foreign workers will continue to be in demand in many Arab countries for some time to come. their presence, as long as it is within the rules of the host country should not be considered a threat to the national character.

To the contrary, it serves both the economic and cultural interests of the state. And except for the cases of Kuwait, Iraq and Libya, other Arab countries offer secure working conditions to the expatriates in their states and do not allow political considerations be the decisive factor in their attitudes, towards them (3).

Another article appeared in the same newspaper on Thursday April 29, 1993 advising private firms to employ nationals. According to the article, Nationals form only 7% of UAE work force and just a little over 1% in the private sector. This was stated by Hussein Sultan, managing Director of Emirates Petroleum Products Company, (EPPCO) at the inauguration of the Career Fair at the Dubai Women's College which was held under the patronage of the Chancellor of Higher Colleges of Technology and Minister for Higher Education, Sheikh Nahyan Bin Mubarak Al Nahyan.

The fair was declared open by Sheikh Ahmed Bin Saeed al Maktoum, President of Dubai Civil Aviation and chairman of Emirates Airlines.

During the fair, several prominent members of the business community presented papers covering various subjects from Emiratisation in the private sector to the Women's Role in Market Research.

Talking about the subject of "Emiratisation in the Private Industry" Hussein sultan of EPPCO said that the country has seen a dramatic transformation in the past two decades and developments have included the promoting of this country within the commercial and tourism sphere.

Sultan pointed out, however, that such developments also need the skills of highly trained nationals as well as expatriates. Citing the minuscule percentage of nationals in the work force, he said: "this is therefore, a serious problem which could have adverse effects. We need to be pre-active to correct the imbalance." said Sultan.

" The Higher Colleges of Technology (HCT) are a system of post secondary institutions operated by the UAE government to provide technological training for UAE nationals in various branches of Business and Engineering. New programs are planned in Health Sciences and communications Arts. Programs are of three years duration, normally preceded by a one year foundations program. Instruction is in English and there is a strong emphasis on computer skills and links with business and industry. Facilities and equipment are fist class ".

Sultan said that the private sector should have a plan to employ national candidates in select positions while by the same token, young national women and men must show that they are worthwhile candidates who are willing to learn and to be trained as well as have "reasonable" remuneration expectations.

"The UAE is not short of resources but it is important to apply resources for maximum benefit. the private sector should be encouraged to employ nationals," said Sultan.

He also stated that it is important to properly prepare national candidates for work in the market, to have a continuous review of the educational system here in order to keep up with developments in addition to having the government commend and reward corporations who seek to employ nationals

"I feel that the Higher Colleges of Technology will play a vital role in making everyone seek emiratisation," said Sultan.

Various other discussions also focused on industry expectations and career opportunities in the computer, hotel, insurance and banking industry.

The "Career Fair" has been designed to bring together potential employers as well as present and future graduates of the Dubai Women's College.

It provides an ideal opportunity for the students to get to know what is available in the market as well as to give the market a look at the potential and expectations of the students.

The day-long fair included an afternoon session which involved student presentations of the programmes being offered at the college as well as presentations by graduates about their recent work placement experiences.

A panel discussion under the subject of national women's Perspective of Expectation at Work included the participation of Lubna Al Qassimi from the Jebel Ali Free Zone, farida Badri from the Abu Dhabi women's College and Latifa Fikree from Citibank. Fikree herself is a recent graduate of the Dubai Women's College. Twenty-five organisations have participated in the Career Fair (4).

A recent major consultancy project was authorised by the joint Omani-american Commission and Omani Chamber of Commerce to prepare a study and a survey on private sector training needs to determine ways in which private sector development in Oman can be facilitated. the crux of the study is to train Omani nationals to take over from expatriates.

According to an article published in the Gulf News in April, 1992, it was stated that the strong move being made in Gulf countries to 'Arabise the workforce has accelerated the process of migration of expatriate professional to Canada from countries like the UAE, according to a study on immigration to Canada.

The study, conducted by an independent immigration and investment consultancy group in Canada, says the people who are seeking to migrate from Gulf countries are mostly professionals from Indian, Pakistani and Sri Lankan communities as well as certain Arab professionals who want to find a secure home and a future in Canada for their families, especially their children.

The study points out that the search for a new home in Canada by such people has become intensified in the wake of the moves being made in the Gulf countries to Arabise their workforce.

"A good many of them, having worked here for a considerable length of time, do not relish the idea of returning home because of the problems in their own countries. They also fear displacement in their jobs here as the Arabisation moves take concrete form. So they want to do the next best thing-migrate to Canada" said a spokesman for the immigration consultancy group.

The highest number of applicants for migration to Canada from this part of the world were from Kuwait both before and after the Gulf war, followed by Saudi Arabia and the UAE.

The number of people wanting to migrate to Canada from the Gulf has increased so much they now constitute the third highest migrant groups. The list is headed by people from Hong Kong, closely followed by Taiwanese.

Why is Canada proving more attractive to people in search of greener pastures? The study points out that Canada is being viewed as a place that offers stability-both economic and political.

It is seen as a young nation with enormous potential and natural resources. Canada is in recession now, but there is a strong belief that the situation would turn for the better by the end of this year.

Canada is also attractive to immigrants because of its social welfare system which provides for free education and medical facilities.

All these make Canada a very attractive place for potential immigrants especially professional people to settle down and build a home for the future, study pointed out (5).

5.3.6 Conclusion

Governments in the Gulf are now setting up government agencies to monitor nationalisation of workforce. The aim of these authorities is to organise the process of integrating nationals in the workforce and to establish training institutes and colleges of technology to make nationals effectively competitive with expatriate employees. The UAE government with the establishment of the Higher Colleges of Technology is considered to be the leader among the other Gulf states in this aspect. Recent newspaper articles seem to indicate that the UAE may open the doors of the Higher Colleges of Technology to students from other Gulf states and thus truly making the transfer of technology within the grasp of those who are less fortunate.

5.4 Analysis of survey responses : Computer Hardware and Software users

5.4.1 Introduction

This section deals with analysis of responses received from hardware and software users in the Middle East. The following table gives a breakdown of the type of organisations/industries approached and responded to the survey questionnaire:

Table 5.8 : Analysis of response by industry

	Organisations approached		Organisations responded	
	No.	%	No.	%
Government agencies	100	11.78	10	10.00
Computer suppliers	12	1.41	4	33.33
Other business:				
Oil industry	51	6.01	2	3.92
Manufacturing & Contracting	51	6.01	1	1.96
Retail and leisure	50	5.89	16	32.00
Financial	160	18.85	6	3.75
Transport	131	34.63	4	1.36
Others	143	16.84	4	2.80
Total	849	100.00	47	5.54

33.33% or 4 of those responded are computer suppliers, their response was not as suppliers but as users of the computer technology, 32.0% retail and leisure business and 10% government agencies.

Computer suppliers by virtue of their business were amongst the first users of information technology to support operations and to promote business development and growth.

Computer technology has a very important place in the retail and leisure industry as most of the travel and leisure industry is heavily dependent on computers to execute their business transactions.

The introduction of the Micro Computer or Personal Computer, in the early 1980's was the event that, more than anything else, moved computer systems outside the computer room and put them on the user's desk. Improved price/performance ratios of such equipment, combined with inexpensive and sophisticated software for accounting, word processing, spreadsheet and modelling, and the maintenance of simple database information have made these tools indispensable for the users in retail and leisure and also all users a like.

The Government Sector has always been a major user of information technology. Particularly the Ministries and departments including Finance, Health and Immigration.

5.4.2 Analysis of Users By Country

The following table summarises the numbers of users within each country surveyed. High level of response was received from the UAE.

Table 5.9 : Response by country

	Organisations approached		Organisations responded	
	No.	%	No.	%
United Arab Emirates	280	32.98	23	8.21
Qatar	75	8.83	8	10.67
Bahrain	130	15.31	6	4.62
Kuwait	101	11.90	4	3.96
Saudi Arabia	142	16.73	4	2.83
Oman	121	14.25	2	1.65
Other	0	0.00	0	0.00
Totals	849	100.00	47	5.54

Of those responded 72% said they use English language as their main work language while 27.66% claimed Arabic to be their main language at work. Of those who use Arabic as a main language 34% said they used English as a second language at work. The high ratio of Non Arabic usage among computer hardware and software users is attributed to the composition of the users workforce as shown in the following table.

Table 5.10 Computer Hardware and Software users composition of workforce by nationality

	Nationality	*Workforce (%)*
a)	Locals/Gulf nationals	31.70
b)	Arabs from other parts of the Middle East	7.92
c)	Asians (Pakistanis, Indians)	57.78
d)	Europeans	0.87
e)	North Americans	0.26
f)	Other nationalities	1.47

It can be seen from the above figures that over 50% of the computer hardware and software users are Non-Arabs.

5.4.3 Analysis Of Application Systems And Users

According to the survey the total number of all computer systems users is 4244 person. Approximately 45% are of Arab Origin and that 55% of all users cannot read or write Arabic. The following table gives further analysis of the number of persons within the Organisations surveyed who can use the application systems on a regular basis and the percentage of those who speak Arabic.

Table 5.11 Analysis of number of persons within the organisation who can use the application systems regularly as part of their normal duties.

		Total No. of staff	% Arabic speaking
a)	Computer specialists (eg. programmers)	216	49.69
b)	Departmental heads and senior executives	406	44.19
c)	Clerical staff (other than specialist data input staff)	2033	42.72
d)	Non-clerical staff (eg. sales persons, engineers)	374	35.17
e)	Data input and data control staff	313	33.69
f)	Other	103	49.99

The use of Non-Arabic Application Systems used by staff whose first language is Arabic may further be analysed in the following table.

Table 5.12 Analysis of the effect of non-Arabic application systems used by staff whole first language is Arabic..

	Lack of Arabic systems:	Yes %	No %
a)	A major disadvantage to your organisation's use of modern technology	8.51	70.21
b)	A limiting factor in recruitment of staff	8.51	70.21
c)	A limiting factor on the extent to which the organisation can automate data processing functions	10.64	63.83
d)	A limiting factor on the speed with which the organisation can introduce new systems	17.02	57.45
e)	Presents few operational difficulties	36.17	36.17

Over 70% of the respondents agreed that there is no major disadvantage to their organisations for using Non-Arabic applications, similar percentage of users confirmed that it is not a limiting factor in the recruitment of new staff and in automating and introducing new systems.

5.4.4 Factors limiting the expansion of computer accounting systems in Arabic

Of the total number of users surveyed 32% consider that the lack of demand by users as a major factor limiting the expansion of computer accounting systems in Arabic while 26% relate it to the lack of trained Arab staff to devise and manage the system. Other factors such as hardware constraints, lack of Arabic database management systems are not considered to be major contributing and or limiting factors as shown below:

Table 5.13 analysis of factors limiting the expansion of computer accounting systems in Arabic.

		Major (%)	Minor (%)	None (%)
(a)	Hardware constraints	12.77	12.77	46.81
(b)	Lack of Arabic compilers	12.77	14.89	31.91
(c)	Lack of Arabic data base management system	10.64	21.28	36.17
(d)	Cost of Arabic systems relative to English systems	10.64	17.02	40.43
(e)	Lack of demand by users	31.91	12.77	29.79
(f)	Lack of trained Arab staff	25.53	17.02	36.17
(g)	Other factors	0.00	4.26	19.15

Out of the organisations surveyed 21 organisations or 44% of the user population responded claim to use bilingual systems. According to results shown in the table below 51% the respondents stated that the reasons for not using bilingual systems is that a bilingual system is not really needed in the workplace.

Table 5.14 Analysis of reasons for not using bilingual systems:

		Yes (%)
(a)	Cost of hardware	2.13
(b)	Hardware unable to operate bilingually	2.13
(c)	Unaware that bilingual systems are available or possible	4.26
(d)	No need for bilingual systems	51.06

The majority of users considered that there was no need for a bilingual systems. This response is understood because the majority of users are expatriates and may be familiar with English systems.

The story of Arabisation has been one of the major changes in the region during the 1990's According to Khaldoon Tabaza in a recent article published in the Computer guide. The article states that approximately 210 million people living in 21 countries speak Arabic as their native language. For them at least, Arabic is considered more than just a language. In the last few decades, the Arab world in general, and the Gulf area in particular acquired an important role as a trade partner in the global information technology revolution.

Naturally, the implementation of Arabic into this field had to follow, and Arabisation emerged as a new development that was vital for marketing the products of international software and hardware companies in the Arab world.

The first beginnings of Arabisation date back to the late seventies when some international companies started to incorporate the shapes of Arabic characters in the display units they produce, giving developers the opportunity to write the applications necessary to bring them out.

According to a registered patent, the first Arabic code page for computers was developed by Dr Ahmad Alakhadar Ghazal at the Center for Training Research at the King Mohammed the Fifth University in Morocco. This code page was later used as a basis for a standard Arabic code page referred to as ASMO 449 which was issued by the Arab Standard and Measurements Organisations (one of the Arab league organisations).

As PC's further spread in the Arab world the need to freely incorporate Arabic into existing Latin applications became increasingly important. The concept of transparent Arabisation became dominant, with many utilities being released by Arab developers to achieve this. Developers adopted different methods to provide transparent Arabisation by adding special hardware to the display units, others adopted the operating system's Arabisation shells, some others thought that a complete Arabic operating system would be the solution.

At Gitex 86 to 1993 users saw the release, from a number of companies including Jordanian company Sedco, a transparent Arabisation solution for peripheral units. The company claims its Ameer Arabisation card was the first of its kind. The basic function of Ameer was to convert the signals from the computer to the peripheral units so that Arabic shapes of characters will appear on the screen instead of Latin one without the need to interfere with the original application. This enabled users in the Arab world to use Arabic characters in most Latin applications.

Other advantages of this hardware solution of the Arabisation problem is that is could be used with different operating system such as MS-DOS and UNIX. It could be used on a single PC or on peripheral units connected to a mainframe or minicomputer. However, this particular approach proved to be relatively expensive and required expert setting and maintenance and this prevented this solution becoming popular.

Bahraini company 01 followed closely in 1987 with the software solution Nafitha. This works as a shell around MS-DOS and enables users to incorporate the Arabic in Latin 8-bit applications. Nafitha became very popular as the standard Arabisation utility, and later in 1990 to 1993 many other similar Arabisation shells appeared in the market as good competitors. Mosa'ed Al-Arabi from Saudisoft is an Arabisation shell that acquired considerable popularity.

In 1989, a Kuwaiti company Al Amiah released Sakhr PC Arabisation shell which was an improved shell, offering a built-in Arabic spell checker and word analyser. The newer features of Sakhr PC Arabisation shell didn't mean that this was solution the market was waiting for as the user still had to buy a Sakhr PC or a Sakhr Arabisation card in order to get the Arabisation shell.

In 1992, Al Alamiah released version 2.0 of the Sakhr Arabisation shell on floppy discs with many added features and the new version is having much more success that its precedent. In its next version, Al Alamiah is expected to incorporate an Arabic grammar check technology.

Arabic operating systems appeared late in 1988 when Microsoft released Arabic Doc 3.2 which then was the only one of its type.

The most important event in the Arabisation field since Arabic characters first appeared on a computer terminal would now certainly be the Arabisation of Microsoft Windows, and this event is expected, in many ways to shape the future of personal computing in the Arab world in the nineties.

As the most successful graphical user interface (GUI), Microsoft Windows managed to make revolutionary changes in the distribution and nature of PC users all over the world similar to the changes made by Macintosh operating system nearly a decade ago.

The user won't now have to memorise a vast amount of textual formulas and read huge boring complicated manuals in order to use a PC. The computer screen now is very similar to be user's desktop and the skill needed to be operate the most complicated applications now are only a little bit more than knowing how to move a mouse on a pad and click on a button.

In the field of Arabisation of Windows, users have two different options. The first options is to get Microsoft Arabic Windows 3.1, which is an Arabic version of the hottest selling ever computer product, this enables the user to have Arabic menus and messages as well as to incorporate Arabic in most Latin applications developed for the Windows environment, and of course, to run all Arabic applications developed for Arabic Windows.

The other options is to get al Alamiah Arabisation kit for windows 3.0 or Windows 3.1 which also enables the user to use Arabic in Latin Windows applications and to change the messages in these applications to Arabic.

An additional advantage of Microsoft Arabic Windows 3.1 is that the user can cut and paste between Windows application and other applications running under DOS Windows using the main DOS Arabisation will allow users to incorporate Arabic in most existing Latin applications for Windows; which to a large extent is true.. Microsoft's point of view is that transparency could never solve the problems of Arabic users.

The perfect transparent solution would still be defective in many aspects, and that the best solution would be to develop a solid ground for developers, one on which they can build Arabic applications free of any problems. Al Alamiah's Arabisation solution, being only a shell, is never going to be able to provide a solid ground for development effort.

Another factor, which might determine the outcome of the windows was it the price. Al Alamiah's Arabisation would presume that the user bought an original copy of Microsoft's Windows 3.0 (or version 31. later on). the user then has also to pay for Al Alamiah's package which would bring the cost of its package to more than twice the price of Microsoft's Arabic Windows.

As Arabic became an integrated part of Microsoft's Window's project, an Arabic version of Windows NT is expected within three months of the release of the Latin version. In addition, Arabic versions of Microsoft's applications for Windows such as Word and Excel and their upgrades are expected sooner than many would expect. This strengthen Microsoft's position in the Arabic Windows war. One thing for user is that applications developed for Microsoft Arabic Windows will not run under Al Alamiah's Arabisation for Windows and vice versa. This will cause many problems for users and shatter many development efforts.

As Arabisation seems to be streamlined into the *Windows environment*, *another global* development which will almost certainly effect Arab PC users and the Arabisations industry in general is the appearance of Unicode as the standard global code page which will take care of most of the Arabisation aspects already taken care of by many of the utilities in the market.

Developed by the biggest players in the international software industry like Microsoft, IBM, Apple and others, Unicode is an international code page which will provide the national language support for every language on Earth. Unicode is expected to be supported in the forthcoming version of Microsoft Windows, the Macintosh operating system and Microsoft Windows NT.

The aspect which is still untouched in the Arabisation field is that of GUI running as a shell over multi-user operating systems, such as X-Windows, which runs as a GUI for UNIX. Al Alamiah promised a future Arabisation for X-Windows and other companies like Sedco are considering such plans in the future (6).

Other articles on Arabisation were presented at the 1992 Gulf Information Technology Conference held in Dubai, UAE from 14-17 November 1992 at the Dubai World Trade Center.

The articles reflect the mood in the region and the desire by the users' business community to continue the march Arabisation of software.

Mohammed Khatib, a Senior Technical Consultant at Oracle Middle East Office in Dubai, wrote in an article on "Multilingual Application Development" that as the scope of computer usage in the Middle East expands, organisations are requesting that computerisation solutions include support for both Arabic and English languages. This places the burden upon application developers who are responsible for delivering systems with support for multilingual (mostly Arabic/Latin) operations. Developers turn on to the hardware and software vendors to request native support for bilingual features in their respective products.

In general, hardware and software manufacturers provide special terminal/software drivers to support the Arabic language. These Arabic terminals/drivers supports displaying Arabic and English data in the appropriate form of a character. Most applications are completely transparent to the contextual analysis and display direction support performed by the Arabic terminal/driver.

At the hardware level, bilingual display terminals are available which support display of bilingual data. In general, these terminals cater for both Arabic, Latin and mixed Arabic/Latin data. In addition, hardware vendors provide bilingual printers to print Arabic and mixed language data. In order to support the Arabic alphabet, many hardware manufacturers defined their own Arabic

character sets. The Arabic Organisation for Standardisation and Metrology (ASMO) and the International Organisation for Standardisation (ISO) introduced various standard character sets for Arabic that most hardware vendors support in their Arabisation devices.

At the software level, developers are requesting vendors to provide supporting features and tools to help in managing bilingual data. Thus, software packages need to recognise the Arabic character sets, and support Arabised data manipulation features such as character sorting, specialised functions, Arabic data support, and Arabic system and status messages.

The Arabic language has special distinguishing characteristics. The Arabic alphabets descended from the Aramaic script, and the display shape of a character depends on its context in the word. The writing direction of character data in Arabic is from right-to-left, while for numbers, the writing direction is from left-to-right. In addition, Arabic letters do not have uppercase/lowercase distinction. This requires that case conversion functions need to recognise Arabic characters, and do not attempt to perform case conversion on Arabic data when the character string includes bilingual data.

Along with the diversity of Arabic hardware and software solutions in the market, the lack of standards for Arabic in the industry is the most challenging issue faced by application developers and tools vendors. The non-consistent approach in Arabisation is not limited to character encoding schemes, but also includes control of interface devices. If an application is designed to interface with one Arabic terminal type, it may not necessarily work with other types of Arabic terminals. The parameters and escape sequences used for defining and controlling the terminal behaviour is not portable across different Arabic terminal. The same apply to printers and Arabisation software. Thus, the biggest challenge for Arabic application is portability across systems that uses different display devices. He goes on to state that the basic challenges faced by bilingual application developer involving Arabic application is identifying the various issued of application Arabisation to enable developers determine which user-requirements they can support, which Arabisation features are automatically supported by the software development tools, and what remaining features they will have to implement in the application.

It is essential that Arabic support gets incorporated as an integral part of the general NLS strategy. This guarantees continuity of support of Arabic in future enhancement of the software (7).

According to Mr al-Aswad language support for computer systems has become the norm rather than the exception. The achievement has resulted in a variety of standards and implementation methods, though a few have emerged as dominant.

A computer system may be divided into two main environments with respect to Arabisation Text and graphics. Arabic language support solution for each is recommended. Three different styles of Arabisation. 7-bit, 8-bit and 16 bit. Each has its advantages and disadvantages. For GIS, Arabic language support is an important requirements. The minimum capabilities can be summarised as follows:

- Ability to annotate maps and drawings with Arabic text.
- Full Arabic language support for database, allowing population and manipulation of bilingual records.
- Ability to associate bilingual database records with graphical entities, for use in spatial and attribute queries.

Small and large computer companies have realised that Arabic solutions are integral components of products offering for the Arab market.

Computer technology should not be limited to English speakers only. Using any system in the operator's mother tongue is always more productive. Additionally there are many cases where the use of Arabic is required by law, for example a Land Owner Certificate (8).

5.4.5 Analysis of Arabic terms and quality of language used in Arabic systems

According to the respondents the quality of Arabic technical accounting terms used in Arabic systems was not consistent. 18% of the respondents consider the quality to be poor while 17% consider it to be acceptable. 10% cosider it to be good.

21% of the respondents considered Non-technical Arabic language quality to be acceptable whereas 17% consider this general quality to be good. As shown in the table below:

Table 5.15 Analysis of Arabic technical accounting terms and non-technical Arabic language used:

		Good (%)	Acceptable (%)	Poor (%)
(a)	Quality of technical accounting terms in Arabic	10.64	17.02	18.11
(b)	General quality of the non-technical Arabic language	17.02	21.28	1.00

The major concern expressed by all users is that definition of terms differ from one source to the other and that there is no one definitive source to refer to in the market place.

5.4.6 Computer Hardware

According to the survey the number of organisations which have an in-house computer is 44. The type of the main computer hardware installed is given below:

Table 5.16 Type of main computer hardware

		Numbers	%
(a)	Mainframe computer	6	13.6
(b)	Mini-computer	22	50.0
(c)	Micro-computer(s)	16	36.4

Downsizing was considered by the users to be a major issue particularly in the light of advancement in technology and miniaturisation of Micro processors and memory and storage devices.

Another issue of concern expressed by the users relate to the higher cost of maintaining Mainframe Computers in relation to the cost of buying more advanced Mini-Computers which can perform similar tasks at a very low cost. The majority of users felt that they did not get value for money from their old computer hardware.

5.4.7 Language of operating systems

Almost 96% of the respondents stated that English is the language of operating systems currently in use.

5.4.8 Application software run on main computer

30% of respondents indicated that the applications systems in their organisations were bought from outside organisations. Most of the packages bought according to the respondents are off the shelf packages while others indicated that they acquired customised applications software.

18% of respondents stated that most of the applications are developed in-house by their staff. They range from simple database to sophisticated accounting and financial applications as shown in the following table :

Table 5.17 Applications run on the organisation's main computer system

Type of application		Was system bought		Language of operations		
		Yes %	No %	English %	Arabic %	Other (Indian/ Farsi) %
(a)	General ledger	55.32	29.79	70.21	14.89	0.00
(b)	Management accounting reports	44.68	31.91	63.83	10.64	2.13
(c)	Budgeting	38.30	34.04	57.45	12.77	2.13
(d)	Accounts payable	46.81	25.53	59.57	10.64	2.13
(e)	Invoicing and sales analysis	42.55	0.00	53.19	10.64	0.00
(f)	Accounts receivable	46.81	51.06	61.70	10.64	0.00
(g)	Stock records	29.79	19.15	42.55	6.38	0.00
(h)	Stock control, including recording	31.91	21.28	46.81	6.38	0.00
(i)	Production planning	6.38	10.64	14.89	2.13	0.00
(j)	Production control	4.26	12.77	14.89	2.13	0.00
(k)	Reservation system (eg. hotels)	17.02	29.79	36.17	10.64	0.00
(l)	Payroll	36.17	36.17	57.45	14.89	0.00
(m)	Personnel information	17.02	29.79	36.17	10.64	0.00
(n)	Fixed asset register	14.89	34.04	46.81	2.13	0.00
(o)	Depreciation accounting	8.51	27.66	34.04	2.13	0.00
(p)	Fleet control (eg. vehicles, ships)	0.00	10.64	10.64	0.00	0.00
(q)	Word processing	78.72	2.13	51.06	27.66	2.13
(r)	Telex	12.77	2.13	14.89	2.13	0.00
(s)	Internal mail	12.77	0.00	10.64	2.13	0.00
(t)	Spreadsheet	74.47	2.13	65.96	8.51	2.13
(u)	Other office automation product	10.64	2.13	4.26	8.51	0.00

It is most interesting to note that 79% of the respondents use word processing packages and 75% of the respondents use spreadsheets. This overwhelming majority is attributed to the ease of use and prices combination and the fact that they are PC based applications

Accounting packages such as general ledger, accounts payable accounts receivable and stock records and control are of major use by the respondents while office automation including internal mail is being considered by the users to be a new area for them to consider in their organisation.

5.4.9 Applications software run on the organisations equipment other than the main computer system.

According to users respondents to the survey two major applications are run on equipment other than their main computer system. They are namely word processing and spreadsheet. This is understandable because most of these packages can run on a stand alone PC and/or word processing equipment as shown in the table below:

Table 5.18 Applications run on the organisations equipment other than the main computer system

Type of application		Was system bought		Language of operations	
		Yes	No	English	Arabic
		%	%	%	%
(a)	General ledger	2.13	0.00	2.13	0.00
(b)	Management accounting reports	2.13	0.00	2.13	0.00
(c)	Budgeting	0.00	0.00	0.00	0.00
(d)	Accounts payable	2.13	0.00	2.13	0.00
(e)	Invoicing and sales analysis	0.00	0.00	0.00	0.00
(f)	Accounts receivable	0.00	0.00	0.00	0.00
(g)	Stock records	0.00	0.00	0.00	0.00
(h)	Stock control, including recording	0.00	0.00	0.00	0.00
(i)	Production planning	0.00	0.00	0.00	0.00
(j)	Production control	0.00	0.00	0.00	0.00
(k)	Reservation system (eg. hotels)	0.00	0.00	0.00	0.00
(l)	Payroll	0.00	2.13	2.13	0.00
(m)	Personnel information	0.00	0.00	0.00	0.00
(n)	Fixed asset register	0.00	0.00	0.00	0.00
(o)	Depreciation accounting	0.00	0.00	0.00	0.00
(p)	Fleet control (eg. vehicles, ships)	0.00	0.00	0.00	0.00
(q)	Word processing	65.96	4.26	44.68	21.28
(r)	Telex	0.00	0.00	0.00	0.00
(s)	Internal mail	0.00	0.00	0.00	0.00
(t)	Spreadsheet	59.57	4.26	0.00	0.00
(u)	Other office automation product	12.77	6.38	10.64	4.26
Grand total (% of users)		20.67	2.43	9.12	3.65

5.4.10 Use of Consultants

Of the total respondents 47% stated that the type of professional advice bought on computerisation is related to the selection of software and assistance during implementation while 43% claimed to have bought advice on the selection of hardware and 34% said on the assessment of needs for computerisation.

Table 5.19 Type of professional advice obtained on computerisation

Type of professional advice obtained.		Yes %
(a)	Assessment of needs for computerisation	34.04
(b)	Selection of hardware	42.55
(c)	Selection of software	46.81
(d)	Implementation assistance	46.81

Some of the users were dissatisfied with the level of service provided. One user claimed that the advice his organisation bought were not in concert with the overall strategic planning of his organisation while other users complained that the advice provided was self serving and very limited in scope and content.

According to respondents 43% of the computerisation advice is bought in from hardware and software vendors while 15% stated that they bought advice from computer consultants. 13% of the users claimed that they used their external auditors as shown below:

Table 5.20 : type of organisation from whom professional advice is bought in

		Yes %
(a)	External auditors	12.77
(b)	Hardware/software vendors	42.55
(c)	Computer consultants	14.89
(d)	University/colleges	2.13
(e)	Other	6.38

Key comments made by the users are related to the competence of consultants used and their objectivity. Some users claimed that consultants were using their offices as training grounds for newly recruited information technology consultants while others claimed that consultants were lacking in the skills they were hired for.

5.4.11 Training on the use of information technology

The majority of training provided to users according to the survey was provided from within the organisation.

43% of respondents stated that they have taken in-house training on word processing while 11% claimed to have used outside sources. Most of the respondents stated that computer hardware and software suppliers are used to provide external training. This is more so on software packages bought from outside the organisations than those developed within the organisations. The following table summarises users responses on the source of advice and area of expertise.

Table 5.21 : Source and area of advice on computer training

	Area of expertise	Source (%) Internal	Bought-in
(a)	General accounting	31.91	17.02
(b)	Spreadsheet & graphics	36.17	19.15
(c)	Financial modelling	23.40	14.89
(d)	Database	25.53	17.02
(e)	Accounting systems and procedures	36.17	19.15
(f)	Data processing	34.04	14.89
(g)	Word processing	42.55	10.64
(h)	Electronic mail	21.28	14.89
(i)	Other office automation applications	14.89	4.26

Most of the language in which the training according to the majority of respondents was provided in English. As shown in the table below:

Table 5.22 : Language in which training is provided to staff on the use of computer technology

		Language (%) English	Arabic
(a)	General accounting	48.94	4.26
(b)	Spreadsheet & graphics	53.19	6.38
(c)	Financial modelling	21.28	0.00
(d)	Database	38.30	12.77
(e)	Accounting systems and procedures	36.17	4.26
(f)	Data processing	40.43	10.64
(g)	Word processing	46.81	23.40
(h)	Electronic mail	19.15	4.26
(i)	Other office automation applications	4.26	2.13

Users comments were directed at the quality of material and instructions provided. Two users stated that the manuals provided by the vendors were below their expectations while others commented on the lack of organised training programme in their organisation during the switch of their organisations from the manual to the computerised systems. One user stated that his organisation lacks strategic training plans and that training in his organisation stops immediately after computer systems implementation. Continuous training of users on new developments and software upgrade according to users surveyed is ignored.

5.4.12 Overall assessment on the ease of use and implementation of accounting systems

Overwhelming majority of the respondents considered that ease of use and implementation of accounting systems to be acceptable and in most of the cases to be good as stated below:

Table 5.23 : Overall assessment on the ease of use and in implementing computer accounting system

		Good (%)	Acceptable (%)	Poor (%)	None used (%)
(a)	Written definition of user requirements	38.30	23.40	2.13	36.17
(b)	Systems specification prepared by the supplier or computer department	40.43	27.66	4.26	27.66
(c)	Quality of programs delivered for acceptance testing by the user	34.04	38.30	0.00	27.66
(d)	Quantity of program errors after the systems(s) became operational	8.51	53.19	4.26	34.04
(e)	Training	29.79	27.66	8.51	34.04
(f)	Quality of operating instructions	29.79	29.79	6.38	34.04

Most of the comments made by the users were related to the number of errors found in computer programs subsequent to their installation. Three of the users claimed that the computer programs delivered by the vendors were untested.

Most of the errors found according to the respondents were due to poor system specifications.

Two users expressed dissatisfaction with the poor quality of the technical and operating manuals but in general 79% of the executives responsible stated that they were satisfied with the systems installed. To summarise comments:

- Errors and bugs in programs subsequent to delivery
- Untested programs were installed
- Poor testing was carried out by suppliers' staff
- Poor quality original specification by the supplier

5.5 Analysis of Survey Responses - Audit Firms

5.5.1 Introduction

This section deals with analysis of responses received from international and local audit firms operating in the region.

The audit profession which collectively make up what is referred to as " The profession " provide a variety of services, normally including audit tax and consultancy. These firms offer their services to the public on a contract basis and this are said to be in public practice.

A number of studies concerned with I.T. and the accountant have been undertaken over the last ten years. In chapter three a number of these studies have been cited including:

Collier	:	The impact of information technology on the Management Accountant (ICMA -1984)
Carr	:	Information Technology and the Accountant (ACCA - 1985)
Bhaskar & Williams	:	The impact of Micro processing on this small accounting practice (ICAEN - 1984)
Kay	:	The impact of IT on Accountants.
The Institute of Internal Auditors Research Foundation	:	Systems and Audibility & Controls (1991)

The above studies have shown that the technological ground beneath the auditors feet is moving at an unprecedented rate. The auditor according to these studies is confronted with increasing levels of technology in his own working environment. The survey of the accounting and auditing profession in the Middle East focused on how the audit profession in the region responded to the technological changes and what impact this technology had on the profession. The survey questionnaire have been designed to capture information leading to the assessment of how the profession has responded to the advancement of technology through professional development and training, transfer of skills to the local population of the region and the arabisation of the profession in the region.

5.5.2 Analysis of Audit firms responses by country.

The following table summarises the number of audit firms surveyed.

Table 5:24 Response by country : audit firms

	Organisations approached		Organisations responded	
	No	Percentage	No	Percentage
United Arab Emirates	65	40.12	1	1.54
Qatar	10	6.17	2	20.00
Bahrain	12	7.41	1	8.33
Kuwait	12	7.41	0	0.00
Saudi Arabia	46	28.40	4	8.70
Oman	17	10.49	2	11.76
Totals	162	100.00	10	6.17

It should be noted that a large number of audit firms approached for this study declined to respond to the survey questionnaire on the grounds of confidentiality and secrecy of information.

Of those responded 80% stated that the main written language of administration is English while 20% said Arabic. The high ratio of English language use is mainly attributed to satisfying clients requirements and the high ratio of non-Arab staff working in the profession itself and at the clients offices.

5.5.3 Analysis of language of users of computer systems

According to survey results the total number of users of computer systems within the audit firms responded is 195 user. 63% are of non-Arab origin while 37% are Arabs. The majority of organisations employing Arabs are considered to be small accounting Arabs firms. The significant number of users of computer systems are professional expatriate accountants and auditors who are mainly from India and other parts of Asia.

5.5.4 Composition of Audit Firms

Survey Analysis regarding the position of audit firm surveyed within the audit profession is as follows:

Table 5.25 : Analysis of the firm's position within the audit profession.

	Composition of the firm	Number of Firms
a	Local audit firm	3
b	Local audit firm with international affiliation (s)	1
c	International audit firm	6

It can be seen from the above numbers that international audit firms or the so called "big six" are well established in the Middle East and can be found virtually in every part of the Middle East.

These firms have over the year developed good connections with the government and business community clients in the region. One of organisations responded are small audit firms with international association from outside the region. three of local firms responded are small firms with little technical and professional support from outside the Middle East.

Two of the local firms stated that a programme should be considered for:

- Establishing reciprocal arrangements for professional co-operation and professional developments.
- Developing audit guidelines and procedures peculiar to the region and in line with international accounting standards.

Talal Abu Ghazaleh in a recent article published in the Khaleej times of Abu Dhabi dated Tuesday April 13 1993 was quoted as saying that "Arab Accounting Firms should shed isolationist attitude". According to the article " Arab accounting firms were criticised yesterday for neither promoting change nor being part of development in the Arab world".

Talal Abu Ghazeleh, chairman of the Arab Society of Certified Accountants (ASCA), said the accounting profession has been isolated. "But we have ourselves to blame because we distance ourselves from business saying we are professionals. We have to realise that we are businessman and part of the community," he said at a Press conference in Bahrain.

"Accounting firms in this part of the world have a ,mission. They have to provide technical expertise and financial support to bring about change. For example, development in the profession in America has been the result of the effort of leading accounting firms who put in money to bring about change," he said.

"But we in the Arab world have to be shocked and told that practising is not just a business activity but we have to contribute and have a role to play, " said Mr Ghazaleh.

"For this reason the ASCA's', 10th anniversary on October 4 this year will be held in London. Leading Arab firms will be invited and presented with a statement of account and told they have a responsibility to be leaders in the profession and the community," he said.

Mr Ghazaleh was speaking after the ASCA held its board meeting and general meeting concurrently with the Third International Arab Accounting Conference in Bahrain.

The meeting addressed three basic issues - a complete change in the educational system, change in standard setting and legislation governing the profession, particularly in relation to accountability and expectation gap and thirdly, to deal with interaction between accountants and the community.

"We are failing in these three areas at the moment, " noted Mr Ghazaleh.

The recommendation drawn up calls upon ASCA Universities the regional Arab council and related organisations to form a committee for change in the accounting educational system.

It seeks to promote the role of the accountant through media and interaction with community in order to enable him to address the challenges under the new world order. He (the accountant) must come out of his closed professional community to the larger business community, said Mr Ghazaleh.

It hopes to propose to the various Arab ministries to set up a working group that would establish strategy for developing Arab accounting based on international standards after adapting them to the environmental needs including social legal and religious requirements.

It will emphasise and escalate the process of qualifying Arab accountants. It plans to request the International Federation of Accountants to define standards for the responsibility and duty of auditors, as well as, to define standards to govern practising management consultancy services. The recommendations call upon leading Arab and international firms practising in the Arab world to shoulder their responsibility in the development process.

The meeting decided to hold the fourth Arab International Congress of Accountants in 1996 either in Oman or Lebanon.

The ASCA is hoping to set up a regional office in Bahrain by the year end and is discussing the issue with the ministry of commerce and agriculture. Asca has regional offices in Cairo, Amman and Kuwait.

5.5.5 Analysis of Audit Clients

According to audit firms surveyed the mix of audit clients may be summarised as follows:

Table 5.26: Analysis in percentage terms of audit clients mix by business category

Business category		Firms (%)	Distribution (%)
(a)	Government agencies	40	3.18
(b)	Oil industry	50	6.00
(c)	Manufacturing	70	9.79
(d)	Contracting	80	15.06
(e)	Insurance	50	3.79
(f)	Transport	60	4.53
(g)	Banking/financial services	40	14.93
(h)	Wholesale/retail trade	80	23.38
(i)	Education	60	2.57
(j)	Medical/legal services	60	2.33
(k)	Information technology (hardware/Software manufacturers)	10	0.12
(l)	Hotel & tourism/leisure	60	2.45
(m)	Mining	10	0.12
(n)	Construction	50	7.34
(o)	Others	40	4.41

The above analysis indicate that the bulk of audit business is being generated from three main groups. The first being the wholesale/retail trade which represents the majority of businesses in the Gulf. This group consist of trade companies for import and export distribution and retail. The second main source of business for the audit firms is contracting . The contracting industry is currently experiencing a boom in the Middle East and the number of companies operating in the region is on the increase. The third category of business is Banking and Financial Services Institutions which is very dynamic and innovative in the Middle East. They offer wide range of services to a collection of very demanding customers in the region.

Comments made by audit firms regarding their client mix and their expectation from the audit seems to indicate that there is an expectation gap between what the audit firms provide and the demands made by the clients.

Clients according to audit firms surveyed are not aware of the services offered and have vague understanding of the role of the external auditor. The type of financial information requested from external auditor, in most cases are of management accounting nature and in the view of audit firms surveyed, is not considered to be part of the services offered by them within the scope of external audit.

Some audit clients believe that audit firms are expected to report on the operation and not just the financial position of the client. They (the clients) do not know the difference between internal and external auditors.

Other comments made by audit firms are directed at clients dissatisfaction with the quality of information provided by the external auditors particularly on businesses that fail due to poor management and lack of financial and strategic planning. One firm commented that auditors are blamed for everything from Kuwait stock market collapse (Souk Almanakh) to the world stock market crash in October 1987.

5.5.6 Analysis of qualified audit staff.

According to survey results the number of qualified accountants working for the external audit firms is as follows:

Table 5.27 : Analysis of the number of qualified accountants

Number of qualified accountants		Number of Firms
(a)	Fewer than 10	3
(b)	11 - 20	3
(c)	21 - 30	-
(d)	31 - 50	4
(e)	51 or more	-

Sixty percent of organisations surveyed have a complement of staff of upto twenty. Whereas forty percent are with qualified accountants of upto fifty. These statistics seems to indicate that the majority of organisations who responded to the survey are small firms with limited human resources. Even some of the international firms operating in the Middle East vary in size from one location to the other depending on the economic situation of the country in which they operate.

5.5.7 Use of Computer Technology by audit staff

Analysis of survey responses on the number of accounting and auditing staff who use computer technology very regularly in the firm is given below:

Table 5.28: Analysis of number of accounting and auditing staff in the firm who use computer technology very regularly

Number of computer users		Number of Firms
(a)	Fewer than 10	5
(b)	11 - 20	3
(c)	21 - 30	-
(d)	31 - 50	1
(e)	51 or more	1

Most firms use computer technology because of its perceived benefits to the firms in terms of improved quality of services rendered to the clients; better time management of audit assignments and cost reductions resulting from reduction of number of staff and time spent per assignment.

Further analysis of the firms use of computer technology by administrative staff is given below:

Table 5.29: Analysis of the number of staff other than accounting and auditing staff who use computer technology very regularly.

Number of staff		Number of Firms
(a)	Fewer than 10	7
(b)	11 - 20	2
(c)	21 - 30	1
(d)	31 - 50	-
(e)	51 or more	-

Most firms responded stated that administrative tasks within their firms are fully automated particularly word processing, time billings and office correspondence.

5.5.8 Computer Applications Used

The type of applications used by audit firms according to the survey results is as follows:

Table 5.30 : analysis of the type of application and computer uses in the firms

Type of application		Yes (%)	Language (%) English	Arabic
(a)	Accounting	100	50	50
(b)	audit	90	80	10
(c)	Financial modelling systems	50	40	10
(d)	Spreadsheets and graphics	80	60	20
(e)	time ledger	60	50	10
(f)	Billing and accounts receivable	100	80	20
(g)	Word processing	100	50	50

The above table highlights the extent of use of computer applications within the external audit profession. The most successful applications amongst users are accounting packages, billings and accounts receivable and of course word processing.

90% of those who responded stated that they use EDP Audit Application as part of their audit. This is understandable because of the changing role of the accountant and the penetration of information technology in every aspect of their work and all aspects of business life particularly those activities connected with accounting and auditing.

Other applications such as spreadsheets, graphics, time ledger and financial modelling systems are also in use at various rates within the organisations surveyed.

The use of English languages as application language within the firm according to the survey is higher than Arabic. This is more so in audit and billing audit Accounts receivable. The extensive use of the English language is attributed to the heavy use of non-Arab audit staff, bilingual software availability and clients requirements particularly when clients systems and records are maintained in English.

Word processing and Accounting applications are now available in bilingual form and some are Arabic language dedicated.

5.5.9 Staff Training

Audit firms operating in the region are expected to maintain a certain level of skills and knowledge in order to meet their professional obligations. According to survey results, the frequency and the type of application training provided within the firms surveyed is as follows:

Table 5.31 : Analysis of frequency and type of computer training provided to the qualified accountants within the firm

Application	Language (%)		Frequency (%)			
	English	Arabic	Once a year	Twice a year	other	Not applicable
(a) Accounting and auditing	60	10	40	10	20	30
(b) EDP auditing	70	10	30	20	20	30
(c) Financial modelling	30	10	20	10	10	60
(d) Spreadsheet & graphics	60	10	20	10	40	30
(e) Computer assisted audit techniques	40	10	20	10	20	50
(f) Word processing	80	10	20	30	30	20
(g) Other applications	20	10	0	10	20	70

Most of the organisations surveyed stated that they provide training to their staff more frequently than they used to . The majority provide training at least once a year, 10% to 20% of the respondents stated that they provide training twice a year and 20% to 40% more frequently than twice a year.

Overwhelming majority of organisations surveyed stated that they use English as main language of training.

One International firm stated that they provide their staff with a minimum of 40 hours of training per year. They also offer more extensive professional training leading to the completion of three professional designations, The Certified Public Accountant (CPA). The Certified Information Systems Auditor (CISA) and the Certified Internal Auditor (CIA). Such specialised training according to them is also offered to their clients and the business community in general.

Most of the comments made by the audit firms were favourable and reflected of strong commitment to the training of staff on the use of computer technology.

The four key applications which are commonly used in training are automated accounting and auditing, EDP Auditing, Spreadsheet and Graphics and Word processing. These applications in the view of the respondents are adequately covered by their training departments and meet their own organisations requirements to improve the skills and performance of their audit staff.

Knowledge transfer according to one respondent is the ability to efficiently communicate and deploy the collective intellectual capital within the profession and to pass it on to their staff and clients alike. Comments made by smaller firms with less resources were mainly directed at the cost of training of their staff and the severe competition imposed upon them by larger firms.

The majority of respondents stated that the 90% of computer training in their organisation is provided internally. Internal training takes place mainly to deal with computer training of specific interest to the firm such as the firms' computer audit methodology.

5.5.10 Computer Consultancy provided to clients.

Audit firms responded to the survey stated the following as the type of advice provided to their clients:

Table 5.32 : Analysis of the type of advice provided to the clients on computerisation

Type of advice		Firms (%)
(a)	Assessment of needs for computerisation	70.00
(b)	Selection of hardware	20.00
(c)	Selection of software	10.00

International firms in the region do offer much more diversified and integrated information technology consulting. In the view of these firms advances in information technology offer major opportunities to their clients to improve their competitiveness, effectiveness and productivity.

One International firm stated that a major obstacle facing its clients is the lack of skilled personnel to make proper use of information technology. Selecting and implementing systems in their view is a skilled job requiring a careful analysis and a methodical approach which is totally lacking at some of their clients who acquire the technology.

Another firm stated that some of their clients acquired the software prior to selection of hardware. Others have invested in the wrong type of hardware and bought hardware without seeking advice or properly defining their hardware requirements in advance. Most seriously is that the buyers of information technology within their client's organisation are less familiar with the technology and as a result do not provide in their view sound advice they are expected to give their organisation and senior management.

5.5.11 Client Training

The increasing use of computers as a training tool combined with the changing work environment forced most organisations to rethink their human resources strategies. New recruits are expected to have already established skills in computers and computer technology.

Audit firms among other suppliers have been approached by clients to provide the necessary training tin a number of areas. As shown in the following table:

Table 5.33 : Analysis of the area of expertise in which training on the use of computer technology is provided to clients

Area of expertise		Language (%) English	Arabic
(a)	General accounting	80.00	20.00
(b)	Spreadsheet & graphics	90.00	10.00
(c)	Financial modelling	90.00	10.00
(d)	Database	90.00	10.00
(e)	Accounting systems and procedures	90.00	10.00
(f)	Data processing	100.00	0.00
(g)	Word processing	100.00	0.00
(h)	Other office automation applications	100.00	0.00

Most of the training according to the organisation responded was delivered in English.

Most organisations responded stated that the rapid growth in the use of personal computers by their clients has made a positive impact on the organisation way of thinking and training requirements. The objective of most clients is to ensure that they are using automated systems and procedures effectively.

Clients according to audit firms surveyed are now realising the potential gains to be generated from training and ultimate benefits in using office automation through the use of electronic mail and other office automation applications.

Concerted efforts are now expected by audit clients according to the survey to train nationals. One firm (big six) developed a special training programme for nationals. The programme is geared to providing expertise to nationals in accounting and auditing and the use of computer technology.

5.5.12 Sources of Training

According to audit firms surveyed the sources of advice on computer training given to clients is as follows:

Table 5.34 : Analysis of the source of advice on computer training given to clients

		Yes (%)
a)	Internal source	40
b)	Bought in	60

Audit firms stated that their clients prefer internal training as it is more convenient. External training is perceived by clients to provide a very high quality training programme. Most clients preferred to receive reports on the assessment of education and testing of their employees. They considered their audit firms to be more objective in their valuation of trainees.

Respondents have identified the following sources as being the sources of advice acquired by their clients.

Table 5.35 : Analysis of bought in advice on computer training

Bought in		Yes (%)
(a)	Audit firms	20
(b)	Hardware/software vendors	40
(c)	Computer consultants	20
(d)	Others	20

Most audit firms surveyed stated that the main source of advice on computer training is from hardware and software vendors. The reason according to respondents is that computer vendors include training as part of the systems and hardware acquisition offer. Specialised computer training is also provided by computer consultants and other specialists in the field of computer technology. It is interesting to note that audit firms are only considered on courses dealing with accounting and auditing. Because of their technical knowledge, professional skills and judgement and their understanding of professional responsibilities.

5.6 Analysis Of Survey Responses : Colleges And Universities

5.6.1 Introduction

The Gulf Countries which according to Government reports have wisely employed their new found wealth to establish some of the most sophisticated infrastructures, have undertaken an all-out campaign to educate and train the indigenous people in various fields. The ultimate target according to numerous Government reports is to get the Nationals to run the various Government and Semi-Government Establishments. The success achieved to date according to Latheet Farook (10) so far has been substantial - as has been reflected in the increasing number of Nationals employed in almost every possible field.

31 Colleges and Universities were chosen for the survey. The questionnaire was completed by either the head of the Business and commerce Faculty and/or his designate responsible for computer education within the institution

5.6.2 Analysis of respondents by country

The following table summarises the number of colleges and universities who responded within each country surveyed.

Table 5.36 Response by country

	Organisations approached		Organisations approached	
	No	Percentage	No	Percentage
United Arab Emirates	8	25.81	7	87.50
Qatar	3	9.68	0	0.00
Bahrain	7	22.58	0	0.00
Kuwait	0	0.00	0	0.00
Saudi Arabia	10	32.26	1	10.00
Oman	3	9.68	0	0.00
Totals	31	100.00	8	25.80

The overall level of response as can be seen from the above table in the view of the researcher was dissappointing.

Numerous attempts were made by the researcher to contact senior members of Colleges and Universities in the region with a view to gaining their written responses to the survey questionnaire - these were unsuccessfully.

The main reason for not formally responding by the staff of Colleges and Universities is their fear of retaliation from higher authorities in case that they may perceive their comments in a negative and unconstructive manner.

Telephone interviews of Colleges and Universities senior staff in Qatar, Bahrain,, Saudi Arabia and Oman by the researcher has identified a number of issues of concern which can be summarised as follows:

- There is no clear vision of the role of Colleges and Universities as to the purpose of the institution and the long term implications of current educational curriculum on the future manpower and skills requirement.
- No co-ordinated five year strategic plan to explain the direction of the institution and the programs to be introduced.
- Lack of emphasis on Science and Technology and major concentration on Social Studies.
- No quality control over instructional material and delivery methods.

5.6.3 Language Of Administration

The majority of institutions responded stated that their main language of administration is English as shown in the following table:

Table 5.37: Analysis of main written language of administration

Main language of administration		Response of organisations (%)
a)	English	87.50
b)	Arabic	12.50
c)	Others	0.00

The implication of the dominance of the English language as the language of administration in educational institutions is that Arabs of the region with no knowledge of English would be excluded from working in these institutions in their own language. It is safe to assume that this is the cause and effect of expatriates presence.

5.6.4 Users of Computer Systems

The total number of Computer Systems users according to institutions responded is (2111). Of the total users 58% are those whose first language is Arabic while 42% are non-arabs.

The majority of expatriate Arabs according to comments are University professors from Egypt, Jordan and Syria. Non-Arabs are mainly Indians and Europeans

5.6.5 Policies and Guidelines Concerning Computer Utilisation

According to survey results 62.5 % of organisations responded have written policies and guidelines concerning computer utilisation in their institutions.

The table below explains in percentage terms specific policies which are prevalent at these institutions.

Table 5.38 Analysis of the written policies/guidelines concerning computer utilisation adopted by the Universities/Colleges

Policies		Universities/Colleges Percentage
a)	Integration of computer-related learning objectives into existing curriculum	37.50
b)	Sharing equipment	37.50
c)	Purchasing of computer software	37.50
d)	Development of computer software	37.50
e)	Standardisation of hardware and software	37.50
f)	Instructors in servicing on computer applications	37.50
g)	Loaning or renting computers to students or staff	25.00

Comments made by organisations surveyed were generally favourable of the efforts made by their institutions.

The integration of computer - related learning objectives into existing curriculum has according to one respondent been slower than desired. For example introducing computerised accounting into the institutions curriculum took 2 to 3 years. The main package used to educate students was "DAC" Easy Accounting. This off the shelf package is used for small businesses and not in the view of the respondent an ideal package for learning.

"We need to teach the principles of computerised accounting information systems and not expose the students to just a small accounting package" wrote the respondent.

Another comment made was directed at the method used to purchase hardware and software. According to the respondent his institution was subjected to a very long and tedious procedure just to buy the required software. Tenders were issued, Committees were established and meetings took place just to develop criteria and to choose a package. Bureaucracy is time consuming and academics are not prepared to devote time to unnecessary procedural steps. One element which impacts on software acquisition is the availability of funds.

Most of the computer Software Development according to comments made by the organisations surveyed is made through the use of "Data Base" to develop schedules and programs to satisfy a particular subject by the instructors. No major software development is taking place here and teaching of Computer Technology is in its infancy.

5.6.6. Implementing Computer - Based Systems and/or Curricula.

According to survey results 75% of institutions surveyed stated that their institutions have specific time table for implementing computer based systems and/or curricula. This overwhelming majority is attributed to the impact computer education has in the industrialised nations and to the successes in introducing the technology into the class room on a large scale as experienced by countries such as Korea and Singapore.

Computer degree course according to Khaleej Times in an article dated Tuesday January 12, 1993 is now offered in Bahrain. According to the article " A computer post graduate distant learning course is being introduced for the first time in Bahrain.

Management Consultancy Group, which pioneered computer training courses in Bahrain, is offering the course in collaboration with the Sheffield Hallam University, Britain. Professor Ian Draffan, director of the university's school of computing and management services, was in Bahrain to launch the course. It is a 'hybrid management' programme which combines Information Technology (IT) and management and leads to a master's degree in science (M.Sc). "It has been designed specifically to realise the true potential of 'IT' for all types of companies and organisations," said a spokesman for MCG. The course can be taken in three stages over a two year period. the first stage is a PG certificate, the second stage is a PG diploma and third stage is the M.SC. Faculty members from Sheffield Hallam University will conduct three residential tutorials every year in Bahrain. Providing such a facility eliminates the need for students to travel to Britain, said the spokesman."

The role of government in education has been clearly demonstrated by the Federal Government of the U A E. According to Emirates Industrial Bank, Economic Research Section, the economic significance of the Higher Colleges of Technology in the U A E is very high and have long term implications. According to the research that " In line with the development of the UAE economy since the early 80s, the federal government has been seeking to extend and improve the educational infrastructure of the country. Applied economic research has established emphatically that investments in education produce high rates of return for the economy as a whole, though improvements in productivity and by enhancing the quality of decision-making. In the UAE it has been accepted for some time that more specialist facilities are needed in higher education not only to cater for the varying needs of those leaving secondary school, but perhaps, more urgently, to provide the country with the qualified manpower needed to met the growing requirements of technical and managerial positions now arising in industry and services within the UAE economy. A less urgent need, perhaps, is to reduce dependence on foreign manpower

Approximately 700,000 workers are currently employed in different sectors of the U A E economy. Exact figures are not available but of this total U A E nationals are estimated to be only a small minority. Furthermore, most UAE nationals in employment are generally concentrated in government or public sector jobs, and to a small degree in agriculture. The great bulk of jobs in Manufacturing, Electricity and Water, Construction, Trade, Transport and Finance totalling well over 300,000 have been filled by expatriate staff at virtually all levels. It is reckoned that management and supervisory positions in these sectors would be in the region of 30,000. This number is presumed to be growing at around 4-5 per cent a year, slower than the growth rate of the economy, but nevertheless giving an annual incremental demand of about 1500 positions that require a background of skills and education. These jobs would, in the future, demand increasing levels of technical and managerial competence.

There are just under 9000 students in higher education in the U A E; of these about 2000 are in the Higher Colleges of Technology (HCTs). In all roughly 1300 graduates and diplomas are produced in the country every year. It is not known for certain what career paths are being sought by those completing their higher education but anecdotal evidence and conjecture indicates that only a small minority opts for careers outside government or the public sector with the majority, probably opting for self-employment. For various reasons therefore *a mismatch exists between* the requirements of the UAE economy for skilled manpower, especially in the managerial cadres, and its domestic availability. One of the important aims of the HCTs is to eventually correct this demand-supply mismatch.

5.6.7. Factors Impacting on the Introduction of Computer Education.

According to survey results the factors that delayed or hampered Universities progress into computer education are as follows:

Table 5.39 : Analysis of factors that delayed or hampered the University's progress into Computer Education:

Factors	Universities affected (%)
Lack of clear statement of direction from the Ministry of Education	25.00
How University/Institution budgets are organised	50.00
Need of more University/Institution planning	25.00
Lack of student interest	12.50
Lack of adequate hardware	37.50
Other	25.00

25% of the respondents stated that the Ministry of Education in their country has failed to come up with a statement and or guidance on the use of computers in education. Specific comment from one respondent is that the Ministry should initiate and fund a programme to guide the Universities and Colleges in developing policies and guidelines for country wide computer program.

50% of the respondents consider that a major cause of delay in introducing computer education is how the budget to acquire the hardware and software is organised. The budget is not organised on a project basis and accordingly the institutions are unable to acquire the required hardware and software in the required time and date.

According to respondents' comments it is imperative that funds be allocated to Universities for purchasing both hardware and software and that the Ministry should assist with the training of professors and faculty members in order to implement computer education in the Universities and Colleges.

25% stated that there is a need for more planning at the University level. This includes according to the comments program contents, hardware, software and training.

12.5% stated that the number of students who register for computer courses is limited in relation to the total population. The lack of students interest is one of the factors causing the computer program at the University to be less supported and accordingly less funded. Students according to comments made by the respondents are suffering from lack of expertise in using the computer. They even lack the basic competence. In the area of educational use of computer technology lack of interest is a fundamental problem. The Ministry in the view of respondents should take an active role in promoting and funding Computer Education.

Lack of adequate hardware was considered by 37.5% of respondent to be a major problem. The choice of computer that is suited for classroom training has been decided by administrative staff and the decision to acquire a particular meaningful consultation with faculty members on the direction of computer education, computer acquisition and utilisation is lacking.

The Ministry according to comments has provided no support or direction on the selection of hardware, decisions are usually made by purchasing staff on behalf of a Committee of which no faculty member has attended.

5.6.8 Computer Co-ordinator

62.5% of organisations responded stated that they have assigned a computer co-ordinator within their institution to co-ordinate computer use as an instruction tool.

Computers in the region according to responses have been used for instructional purposes for over a year. It is anticipated that the range of bilingual instructional applications will grow steadily with increases in the capacity of computers and the willingness of computer suppliers and software houses to develop more bilingual software. According to comments it is envisaged by users within the region that they will have the same opportunities in the future comparable to those in other advanced countries where entire courses at Universities and Colleges are now taught by computer aided learning (CAL) systems.

5.6.9 Responsibility for Computer Education

According to survey results the departments and or industries who are responsible for major decisions concerning computer - related activities are as follows:

Table 5.40 : Analysis of the departments responsible for each of the following computer-related activities of the institution

Activities		Number of institutions in percentage terms				
		Committee	Ministry of Education Represent	Dean of Univer./ College	Assistant Dean	Computer Specialist
a)	Deciding what computer-related skills and knowledge are to be learned by students	62.50	0.00	12.50	0.00	25.00
b)	Determining computer-related course offerings	75.00	0.00	0.00	0.00	12.50
c)	Establishing budgets for computer-related projects	75.00	0.00	12.50	0.00	12.50
d)	Planning staff training	25.00	0.00	0.00	0.00	50.00
e)	Implementing staff training programs	25.00	0.00	0.00	0.00	50.00
f)	Evaluating and selecting computer software	37.50	0.00	0.00	0.00	62.50
g)	Evaluating and selecting computer software	50.00	0 .00	0.00	0.00	50.00
h)	Assigning computer use	12.50	12.50	0.00	0.00	75.00
i)	Evaluating student benefits from computer-related programs	50.00	0.00	0.00	0.00	12.50
j)	Special computer projects	37.50	12.50	12.50	0.00	37.50

The majority of respondents stated that a Committee is responsible for all major decisions connected with computer related activities.

The involvement of computer specialist in the actual training of staff and in putting forward a training program was also stated by the respondents including the evaluation of hardware, software and in assigning computer use.

One respondent commented that the present educational system has to consider whether the majority of business and social students should be taught increasingly complex levels of computer literally or more simply learn how to utilise a University suggested "Off the Shelf" program such as "DAC" lEasy Accounting.]

"Computer literacy and sophisticated programs as opposed to broad use of "off the shelf "programs prescribed by the Professors and Instructors may be required."

According to the respondents implementation of an appropriate computer program in educational institutions must be considered as a stand alone subject similar to other designated course. Success according to the respondents can only be achieved if the stand alone computer course is complete with all necessary components such as hardware, software, building facilities, instructors time, training, an assigned timetable and clear set of goals and objectives.

Committee decision making process according to respondents is at times very slow and in their view is not very responsive to institution's needs and students expectations.

5.6.10 Level of Support for computer Technology and Automation

According to the survey the level of support given to the introduction of computer technology and automation by faculty members is very high as shown below:

Table 5.41: Analysis of the level of support given to the introduction of computer technology and automation by the faculty members of the Universities

		Level of support	
	Faculty member	Very supportive	Less supportive
a)	Dean / Chairman	75.00	0.00
b)	Professors	62.50	12.50
c)	Assistant Professors	50.00	12.50
d)	Teachers/Tutors	87.50	0.00
	Totals	68.75	6.25

The majority of respondents were very supportive of the technology as they consider the roles that computers might play in the learning - teaching process to be very important.

The primary goal according to respondents is the enhancement of student learning whilst a secondary goal is to support the faculty members in their instructional programmes.

Faculty members should according to one respondent establish the priorities and principles for the application of computers in their respective Universities and Colleges.

5.6.11 Computer Literacy in Colleges and Universities

According to survey results the percentage of Instructors who are considered to be computer literate within the educational institutions responded to the survey questionnaire are as follows:

Table 5.42 : Analysis of the percentage of instructors who are computer literate

	Percentage of Instructors	Percentage of Universities
a)	21 - 30%	12.5
b)	51 - 60%	12.50
c)	61 - 70%	12.50
d)	81 - 90%	12.50
e)	91 - 100%	37.50

The above results indicate that 50% of universities who responded to the survey consider that between 81% to 100% of their instructors to be computer literate. 25% of the respondents consider that 51% to 70% of their instructors to be computer literate whereas only 12.5% stated that 21% to 30% are computer literate.

Instructors according to comments must position themselves to become information managers of a sophisticated and complex educational systems. They should learn to be their own designers of learning program for students and their own administrative tasks.

Other comments relate to instructors who have not developed the same enthusiasm for computers. They tend according to respondents to be sceptical of what is happening in their own institution. They are now required to learn new skills said one respondent and they don't like that.

Some instructors according to the survey do not have the ability to use computers confidently and effectively. But they are willing to learn how to utilise the tool with proper training and guidance.

Further analysis of percentage of instructors who are actively using the computer with curriculum in their institution is given below:

Table 5.43 : Analysis of the percentage of instructors who are actively using the computer with curriculum

	Percentage of Instructors	Percentage of Universities
a)	21 - 30%	25.50
b)	31 - 40%	12.50
c)	61 - 70%	25.00
d)	71 - 80%	12.50
e)	81 - 90%	12.50

The majority of respondents stated that they are actively using computer with curriculum. However it was suggested by the respondents that they need a substantial training to enable them to be more effective in using computers in classroom and to also justify the level of investment in hardware and software. One respondent suggested that there should be a systematic approach to the provision of computer training at the instructor's level and the students in the classroom.

5.6.12 Instructional Applications

According to survey results the instructional applications of computers covered by in service programs offered to instructors in the universities and colleges in the region is as follows:

Table 5.44 : Analysis of the instructional applications of computers covered by in service programs offered to instructors in the universities/colleges

	Applications	Institutions (%)
a)	Use of computers in teaching and learning	50.00
b)	Computer as a subject of instruction	62.00
c)	Computer as a student tool	50.00
d)	Computer as instructor's aid	37.50

The majority of respondents stated that they use computers as a subject of instruction. In technologically advanced Countries when the subject of study is computer as it has been for the last the past two decades, the computer curriculum stands essentially on its own. However now that computer is being used as a tool in various areas of discipline, the need for integration with the curriculum is in the views of those who responded to the survey critical if the potential benefits are to be achieved by the universities and colleges.

Availability of the right software according to the respondents is as critical as the computer itself. Software programming should be given to professional organisations and sufficient funds should be made available for the universities and colleges to make the acquisition..

5.6.13 Type of Computer Courses

According to survey results the type of computer courses offered in terms of their business application are as follows:

Table 5.45 : Analysis of the type of courses offered in terms of their business application

	Type of course	Related	Not related	Not offered
a)	Basic programming	75.00	0.00	0.00
b)	Advanced programming	75.00	0.00	0.00
c)	System design	62.50	0.00	0.00
d)	Computerised financial accounting systems	50.00	0.00	0.00
e)	Financial modelling	12.50	0.00	0.00
f)	Computerised banking techniques	25.00	0.00	12.50
g)	Computerised planning models	0.00	0.00	37.50
h)	Database	62.50	12.50	0.00
i)	Spreadsheet	62.50	12.50	0.00
j)	Word processing	62.50	12.50	0.00
k)	Computer Assisted Audit Techniques (CAAT)	0.00	0.00	25.00
l)	Computer Aided Design (CAD)	12.50	25.00	0.00
m)	Office automation concepts	37.50	12.50	0.00

The majority of respondents stated that the courses offered by their institutions are directly related to business applications. However advanced subjects such (CAAT) and (CAD) and office automation concepts needs further developments in the future.

According to the survey the language of instruction for computer courses is as follows:

Table 5.46 : Analysis of the language of instruction for the computer technology courses

	Language	Institutions (%)
a)	Arabic	0.00
b)	English	50.00
c)	Arabic / English (multilingual)	50.00

Most computer courses are offered in English and half of the programs used according to respondents are bilingual.

Most courses according to respondents provide hands on training to students on how to use computers and software.

50% of the respondents consider the level of emphasis on computer business education by universities to be major while only 12.5% thought the level of emphasis to be of minor nature.

High quality courses according to another respondents is critical to the effective use of computers in the universities and colleges. There is a need to establish a process whereby computer courses and educational software used in the classroom.are evaluated on a regular basis DAC "easy accounting package" wrote, one respondent may not be an ideal package to teach students on computerised financial accounting systems.

Traditionally courses on accounting and accounting related subjects are most frequently requested by students. However, the need to upgrade the quality of these courses should be of paramount importance to the universities and colleges in the region.

Software piracy and unauthorised use of licenced software by students and instructors alike in the region according to one respondent should be tackled by the policy makers at the universities and colleges. Copyrights must also be protected.

5.6.14 Business Community Involvement

According to survey results business community involvement in promoting computer technology in universities and colleges is as follows:

Table 5.47 : Analysis of the direct involvement of the business community in promoting computer technology in educational institutions

		Institutions (%)	
	Business community	Yes	No
a)	Faculty members of other Universities	50.00	25.00
b)	Computer consultants	87.50	0.00
c)	Hardware and software manufacturers, agents and distributors	75.00	12.50
d)	Accounting and auditing firms	50.00	12.50
e)	Industrial and commercial concerns	50.00	12.50

The overwhelming majority of respondents stated that they get full support from their computer consultants, hardware and software manufacturers as represented by their agents and distributors. The form of support according to respondents may include, free educational books and literature and computer hardware and software products and special price offers to students and instructors.

Contribution made by accounting and auditing firms has been in the form of giving seminar to students on computerised accounting and auditing and in promoting the profession of auditing in the universities

5.6.15 Level of Motivation to Introduce Computer Technology

According to survey results the motivation to introduce computer technology into universities is as follows:

Table 5.48 : Analysis of the University level of motivation in introducing computer technology

		Institutions (%) Yes	No
a)	Consider computer technology education as a national policy supported and funded by the Government with a long term view	62.50	37.50
b)	Education in computer technology is needed to complement other study subjects and to increase the level of knowledge	100.00	0.00
c)	Education in computer technology is optional but necessary for graduation	25.00	37.50

All respondents stated that education in computer technology is needed to complement other study subjects and to increase the level of awareness among students of other disciplines and the knowledge of those who specialise in computer studies. 62.5% of the respondents consider computer technology education as a national policy of importance to the future of their people.

Most of the comments made by the respondents were very supportive.

One respondent was in favour of establishing a gulf wide fund to establish computer education at schools, colleges and universities in the region. The direct impact according to the respondent would be on employment of expatriate and future replacement by nationals. Indirect impact would also be generated in other sectors of the economy in the region. The higher the local contents of information technology graduates, the lesser is the region's dependency on expatriates. Wrote another respondent.

5.6.16 Computer Introduction into Universities and Colleges

According to survey results the year in which computer technology was first introduced into universities and colleges is as follows:

Table 5.49 : Analysis of the year in which the computer technology was first introduced as part of the University curriculum

	Year of introduction	Institutions (%) Yes
a)	Within the last two year	37.50
b)	Within the last four years	37.50
c)	More than five year ago	12.50

The majority of respondents stated that computer technology was introduced within the last 2 to 4 years. While 12.5% stated more than five years.

Education is considered by most respondents to be the main instrument for during economic development and change. Investment in technology and human resources according to respondents is taking priority in the national budget. Therefore a national policy for the GCC states as a whole is needed because most of the gulf states do invest a high percentage of their national budget on education and human resources development.

5.6.17 Role of the Ministry of Education in Computer Education

According to survey results the educational institutions' perception of Ministry's role in the support of computer education is as follows:

Table 5.50 : Analysis of the institutions' perception of the Ministry's role in the support of computers in education

	Institution's perception of Ministry's role	Institutions (%)
a)	Leave it totally open to educational institution to purchase hardware and software and to train teachers. The Ministry could provide the monetary support but would not direct or guide software and hardware purchasing.	37.50
b)	The Ministry could play the role of interventionists, targeting specific software purchasing and development and financially support ONE hardware vendor.	25.00
c)	The ministry could specify standards for computer hardware that would enable at least two computer vendors to supply provincially purchased computers to school districts.	0.00
d)	The Ministry could identify priority areas for software purchase identify priority based on curriculum needs. Ministry curriculum committees would incorporate the priority areas into their curriculum development work. In this way computer applications would be integrated directly into the curriculum.	25.00

The majority of respondents (37.5%) consider the role of the Ministry to be financial in funding the acquisition of the required hardware software and training. Whereas 25% of the respondents wants the Ministry to play the role of interventionist . One respondent stated that it is important for the Ministry to provide the leadership and necessary support to ensure that access to computers is available to all students.

A second respondent suggested that the Ministry should limit its involvement to only motivating universities and colleges to proceed with computer education and to provide the necessary funds to acquire the necessary hardware, software and training.

Most respondents stated that the Ministry should involve itself in the orderly development of computer applications including the identification of software , hardware and training. A summary of respondents comments is given below:

- Ministry should provide leadership to drive the use of information technology;
- Ministry should build the cost of acquiring hardware and software in the annual budget;
- Ministry should investigate options by making their own inquiries in connection with hardware & software most suited to their needs;
- Ministry should establish a task force to manage and ensure implementation of IT policy.

5.7 Analysis of Responses : Computer Hardware and Software Suppliers

5.7.1 Introduction

Computer suppliers are the providers of IT products and services in the Gulf. Provide users with hardware, software, printers & peripherals and services, acting as a constant reference source for specific buyers and delivering relevant product information.

This part concerns itself with the analysis of computer hardware and software suppliers response to the survey questionnaire.

5.7.2 Analysis of Suppliers by Country

Analysis of responses of computer hardware and software suppliers by country may be summarised as follows:

Table 5.51 : Response by country

	Organisations approached No.	%	Organisation responded No.	%
United Arab Emirates	145	46.47	19	13.10
Qatar	16	5.13	1	6.25
Bahrain	31	9.94	1	12.90
Kuwait	32	10.26	2	6.25
Saudi Arabia	72	23.08	3	4.17
Oman	13	4.17	0	0.00
Others	3	0.96	0	0.00
Total	312	100.00	29	9.30

29 Organisations or 9.3% of Organisations approached responded to the survey questionnaire.

5.7.3 Language of Administration

The majority of organisations surveyed and responded stated that they use English as the main language of Administration as shown below:

Table 5.52 : Analysis of main written language of administration

	Main language of administration	Response of organisations (%)
a)	English	93.10
b)	Arabic	3.45
c)	Others (Hindi)	3.45

Of those who use Arabic as a second language of Administration 13.79% stated that they use English as a second language whereas 48.28% stated that they use Arabic as a second language.

The significance of using English as a main language of Administration is that the providers or manufacturers literature/manuals and training is provided in English as well as the software they develop and sell. It is common knowledge that industrial countries owe much of their economic superiority to the development and well orchestrated application of technology in various fields.

Knowledge transfer in the view of the researcher can only be achieved when it is understood and put to use by the majority of the people of the Middle East in their own language.

5.7.4 Composition of Workforce by Nationality

Composition of workforce by nationality within organisations responded is as follows:

Table 5.53 : Composition of workforce by nationality

	Nationality	Workforce (%)
a)	Locals/Gulf nationals	1.00
b)	Arabs from other parts of the Middle East	10.13
c)	Asians (Pakistanis, Indians)	60.40
d)	Europeans	16.20
e)	North Americans	6.75
f)	Other nationalities	5.52

The overwhelming majority of computer hardware and software suppliers work force are Non-Arabs. More disturbing to the people of the region is the decimal percentage of locals/gulf nationals working in the field of hardware and software supply and in the information technology field.

5.7.5 Analysis of Users and their Language of Operation

According to the survey the total number of computer systems users within computer hardware and software suppliers organisations who responded to the survey is 851 persons approximately 61% are Non Arabs. This is quite understandable in the light of the composition of this industry's workforce which is highly dominated by expatriate Non Arab workers.

5.7.6 Scope of Activities

Computer hardware and software suppliers scope of activities according to survey results are as follows:

Table 5.54 : Analysis of company's activities

	Scope of activities	Companies (%)
a	Supplier of computer hardware	86.21
b	Supplier of computer maintenance services	86.21
c	Developer of computer software (ie. with design and programming in-house)	68.97
d	Supplier of sub-contracted computer software (ie. with design and programming carried out by sub-contractors or independent software houses)	62.07
e	Providers of training services	79.31

Most international manufacturers and their agents and distributors surveyed consider their scope of activities to be integrated which means that they are able to provide their customers with the required hardware, software and the training needed to operate the hardware and the software and also to provide maintenance to keep all working. Locally established and Intra-Arab suppliers do specialise in one service or another.

The questions in the survey attempted to explore specific issues relating to these organisations contribution to the transfer of skills, Arabisation and Training of workforce.

5.7.7 Supply of Hardware

According to organisations surveyed the type of hardware supplied to customers is as follows:

Table 5.55 : Analysis of the type of hardware the company supplies

	Type of hardware	Companies (%)
a)	Mainframe computers	34.48
b)	Mini-computers	55.17
c)	Micro-computers	86.21
d)	Other specialised computers	41.38

The majority of respondents (86%) stated that their companies supply Micro-computers and (55%) of respondents stated they supply mini-computers against only (34.%) Mainframe computers.

The above analysis merely shows the change in technology and the advancement made to mini and macro computers. Mainframes are usually acquired by Oil Companies and government Ministries/Department because of their need for very large memory and speed.

According to one respondent downsizing of large computers is a cost - effective way for his customers to manage their businesses and to avoid paying large sums of money on maintenance cost. Most customers are now switching to smaller computer systems which offers higher and more cost - effective millions of instructions per second (MTPS) capability and greater return on investment. However, according to the 1992 Ernst & Young special report on technology in Banking that the mainframe remains alive and well in banking in the USA and other industrialised countries. The high volume of transactions the *Gargantuan input* - output requirements, and the necessarily tight security requirements continue to demand the unique features of the mainframe. The report goes on to state that ninety-eight percent of the industry's data resides in either on-line or off-line storage for mainframes and it would be very difficult to move that data to any other environment (13).

5.7.8 Supply of Software

According to organisations surveyed the type of application software packages offered to customers are as follows:

Table 5.56 : Analysis of the application software packages offered by suppliers

	Type of application	Was system bought Yes %	No %	Language of operation English %	Arabic %	Other %
a	General ledger	55.17	17.24	31.03	41.38	0.00
b	Management accounting reports	51.72	20.69	41.38	31.03	0.00
c	Budgeting	51.72	17.24	37.93	31.03	0.00
d	Accounts payable	55.17	17.24	34.48	37.93	0.00
e	Invoicing and sales analysis	51.72	17.24	34.48	34.48	0.00
f	Accounts receivable	58.62	13.79	37.93	34.48	0.00
g	Stock records	55.17	17.24	41.38	31.03	0.00
h	Stock control, including recording	55.17	17.24	41.38	31.03	0.00
i	Production planning	13.79	17.24	20.69	10.34	0.00
j	Production control	10.34	17.24	17.24	10.34	0.00
k	Reservation systems (eg. hotels)	10.34	17.24	10.34	17.24	0.00
l	Payroll	55.17	13.79	44.83	24.14	0.00
m	Personnel information	48.28	13.79	34.48	27.59	0.00
n	Fixed asset register	41.38	17.24	37.93	20.69	0.00
o	Depreciation accounting	27.59	17.24	24.14	20.69	0.00
p	Fleet control (eg. vehicles, ships)	6.90	10.34	6.90	10.34	0.00
q	Word processing	27.59	34.48	20.69	37.93	3.45
r	Telex	10.34	6.90	6.90	10.34	0.00
s	Internal mail	17.24	20.69	10.34	24.14	3.45
t	Spreadsheet	17.24	34.48	20.69	27.59	3.45
u	Other office automation products	20.69	10.34	20.69	10.34	0.00
	Grand total (% of users)	35.30 ====	17.57 ====	27.42 ====	24.96 ====	0.49 ===

A wide range of business software is offered by the computer hardware and software suppliers. The current competitive environment according to one respondent demands that (supplier) provide the latest innovation in application software because computer plays a vital role in processing massive amount of data and the need for sophisticated applications becomes more imminent.

The majority of respondents stated that they provide both in-house developed and off the shelf software to their customers. Custom made software packages such as general ledger and its subsidiaries, human resources, and stock control are common to all suppliers.

27% stated that software application provided to their customers was written in English against 25% in Arabic.

Customised software to specialised industries such as hotels and car rental agencies are also provided by suppliers. The majority of packages are modelled on well tested international packages.

According to respondents technical support, application support, application consulting, training and other services are also provided to customers.

59% of respondents consider the demand for computer accounting systems in Arabic to be moderate and 21% as poor. According to the respondents most of their customers prefer to have their applications software written in English because of ease of use and availability of expertise to run it (expatriate accountants whose first language is English).

The growth rate for computer accounting systems in Arabic according to respondents is 6.59% per year and this trend according to respondents will continue in the future as more and more business and Arab Accounting Graduates enter the work environment.

The number of companies who are providing custom-made computer design and programming services in Arabic is (17) companies or 34.48% of the respondents. The market in the Middle East according to one respondent is open to all software vendors developing or offering software product that works in Arabic. One respondent stated that accounting systems are usually prepared on bilingual basis and that it includes all the necessary functions for the general ledger and also accounts receivable and payables integrated with general ledger.

5.7.9 Number of Sites

According to survey results the total number of sites where companies (users) have installed at least one accounting package is 11,780 users sites. The number of user sites who are currently using accounting packages in Arabic is only 17.59% of total sites reported, whereas the number of user sites with plans to convert to Arabic packages is less than 1%.

5.7.10 Demand for Computerised Arabic Based Accounting Systems

According to survey results the demand in percentage terms for computer accounting systems written in Arabic is as follows:

Table 5.57 : Analysis in percentage terms of the assessment of the companies about the demand for computer accounting systems in Arabic by Arabic users

	Assessment	Companies (%)
a)	Strong	13.79
b)	Moderate	58.62
c)	Poor	20.69

5.7.11 Professional Advice on Computerisation

According to survey results the type of professional advice obtained by customers or offered by suppliers may be summarised as follows:

Table 5.58 : Type of professional advice obtained on computerisation

	Type of professional advice obtained	Yes (%)
a)	Assessment of needs for computerisation .	55.17
b)	Selection of hardware	20.69
c)	Selection of software	6.90
d)	Implementation assistance	6.90

The overwhelming majority of respondents (55%) confirmed that their customers ask for professional advice on the assessment of their needs to computerise. This is more so with smaller companies than with large customers who already have an established data processing centre.

Advice on the selection of hardware is another area where computer hardware and software suppliers are requested to provide to their customers. Two respondents stated that their operation in mainly to provide software support but from time to time they are requested to provide advice on hardware selection. This does not represent a conflict of interest for us (suppliers) as we usually provide software which is UNIX based and can run on all platforms.

Fewer and fewer customers are now seeking advice from us, wrote one respondent except on our own hardware. Most of the requests according to respondent are considered to be information gathering exercises possibly leading to a tender.

5.7.12 Supply of Training Sources

According to survey results the area of expertise where training is provided together with the language in which training is provided is as follows:

Table 5.59 : Language in which training is provided to staff in the use of computer technology

	Area of expertise	Language (%) English	Arabic
a)	General accounting	37.93	31.03
b)	Spreadsheet & graphics	37.93	24.14
c)	Financial modelling	17.24	24.14
d)	Database	34.48	31.03
e)	Accounting systems and procedures	20.69	24.14
f)	Data processing	41.38	24.14
g)	Word processing	27.59	34.48
h)	Electronic mail	27.59	24.14
i)	Other office automation applications	6.90	13.79

Training on packages delivered to customers is given in both Arabic and English languages. More so in English than Arabic.

The type of Organisations from whom the professional advice is bought in according to the survey results is shown below:

Table 5.60 : Type of organisation from whom professional advice is bought in

		Yes %
a)	audit firms	6.90
b)	hardware/software vendor	24.14
c)	computer consultants	17.24
e)	other	10.34

According to respondents most training is purchased as part of the overall hardware and software acquisition deal therefore it is not unusual to have most of their customers seeking advice on computer training from them. Furthermore, respondents also stated that Suppliers are considered by most respondents to be their main source for training; Computer consultants are perceived to be an independent source of advice.

REFERENCES

CHAPTER FIVE

1 Cook, J, and Drufy, D.H., "Management Planning and Control of Information Systems," The society of Management Accountants of Canada, April 1980, pp. 9

2 KPMG "Information Technoloy in the Middle East," Review 1991

3 Ajami T B " Presence Of Expatriates Raises Many Questions " Gulf News, 9 January 1992, Abu Dhabi, UAE.

4 Staff Reporter, " Employ Nationals, Private Firms Urged " Gulf News, 29 April 1993 Abu Dhabi, UAE

5 IBID, 4 April 1992

6 Tabaza K. " Arabisation at the Crossroads " Computer Guide Middle East 1993, PP190-194,

7 Khatib M, " Multinational Application Development " Gulf information Technology Conference 1992, Dubai, UAE

8 Al-Aswad M, " Using Arabic and Non-Latin languages in GIS " Gulf Information Technology Conference, 1992 Dubai, UAE

9 Staff Reporter, " Arab Accounting Firms Told To Shed Isolationist Attitude " Khaleej Times, April 13 1993.

10 Farook, L., "Serving the Needs of Academia," Gulf News, January 1993, Abu Dhabi, UAE

11 Staff Correspondent, "Computer Degree Course," Khaleej Times, January, 1993, Abu Dhabi, UAE

12 Emirates Industrial Bank "The Economic Significance of the Higher Colleges of Technology in the UAE", Vol. 7, No. 12, December 1992

13 Ernst & Young. The 1992 Ernst & Young Special Report on Technology in Banking "The Emergence of the Virtual Bank" Ernst & Young 1992, pp.5